NUMBER HELPS

LOCKHART
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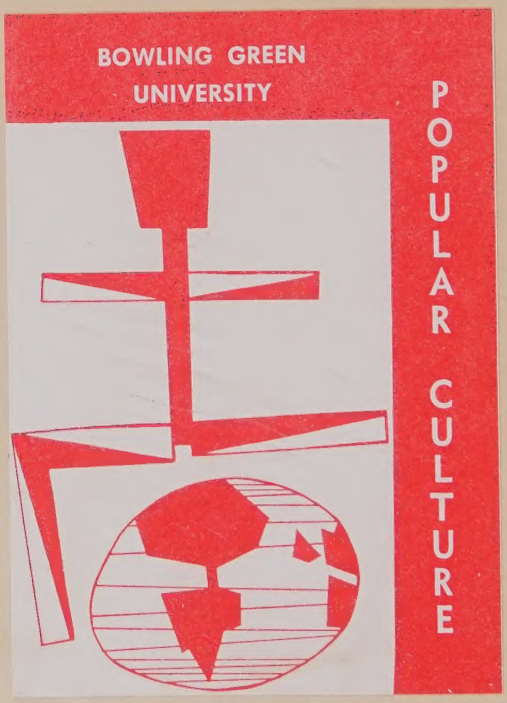
BOWLING GREEN
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POPULAR CULTURE

Mabel A. Jewell

NUMBER HELPS

NUMBER HELPS

Including

NUMBER GAMES, NUMBER RIMES, NUMBER SONGS, SENSE-TRAINING EXERCISES, AND SPEED AND ACCURACY TESTS

By

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THE CONTENTS

		PAGE
The Foreword		23

GAMES

NAME OF GAME	FOR WHAT GRADE	
Addition Relay Race	1, 2, 3	44
Auto Race	1, 2, 3	9
Bags in a Box	2, 3	14
Ball Toss	1, 2, 3, 4	21
Baseball	1, 2	40
Basket Ball	1, 2, 3	54
Bean-Bag Combination Race	2, 3	43
Bean-Bag Counting Game	Kindergarten, 1	4
Birthday Party	1, 2	3
Bouncing Ball	3, 4	58
Bull's-Eye, The	1, 2	6
Card Domino Game	Kindergarten, 1	9
Cat and Mouse	Kindergarten, 1	7
Catch and Say	Kindergarten, 1	44
Catching Mice	4	60
Climbing the Stairs	1, 2	5
Combination and Answer	1, 2, 3	26
Combination Building	1, 2, 3	29
Combination Drill Game	2, 3	12
Combination Making	2, 3, 4	53
Combination Race	1, 2	38
Counting by 2s, 3s, 4s	Kindergarten, 1	48
Cuckoo Clock, The	1, 2, 3	16
Days of the Week	1, 2	30
Decades	2, 3	61
Digits, The	Kindergarten, 1	5

GAMES — *Continued*

NAME OF GAME	FOR WHAT GRADE	PAGE
Dodo	2, 3	11
Domino Game	1, 2, 3	27
Eating Watermelon	1, 2, 3, 4	18
Endless Chain, The	3, 4	34
Factors Game	3, 4	54
Firemen	1, 2, 3	17
Fish Pond	1, 2, 3	41
Flash Card	Kindergarten, 1, 2	10
Flash-Card Drill Game	1, 2	26
Flash Sight Number Drill	2, 3	62
Following the Leader	4	51
Football Game	2, 3, 4	13
Foremen and Helpers	3, 4	58
Fraction Combination Race	4	59
Fortune Wheel	1, 2, 3	16
Forty-five Combinations, The	2, 3	24
Fox and Geese	1, 2, 3, 4	31
Fruit Basket	1, 2, 3	20
Gathering Nuts	1, 2, 3	38
Grab Bag	2, 3	23
Guessing Factors	3, 4	55
Guessing the Number	1, 2, 3	36
Guessing Reversed	1, 2, 3	36
Gun Club	3, 4	61
Hall of Fame	1, 2, 3, 4	36
Hopscotch	2, 3	8
Hunting Wild Geese	2, 3, 4	4
Hurdle Race	2, 3, 4	10
Husking Bee	1, 2, 3, 4	33
Matching Game	Kindergarten, 1	18, 19

GAMES — *Continued*

NAME OF GAME	FOR WHAT GRADE	PAGE
Miscellaneous Drill	3, 4	37
Missing-Number Drill	1, 2, 3	46
Mixed Combinations	3, 4	56
Multiples	3, 4	56
Multiples and Factors	4	50
Multiplication Drill	3, 4	48
Multiplying Down	3, 4	52
Multiplication Wheel, The	3, 4	52
My Family	1, 2, 3	41
Newcomb	2, 3	25
Notation Drill	1, 2	30
Number Building	1, 2, 3	27
Number Family	1, 2	42
Number Race	2, 3	13
Number Spell Down	1, 2, 3, 4	32
One Hundred-Yard Dash, The	2, 3, 4	28
Partners	1, 2	14
Partners — Subtraction Drill	1, 2	47
Picking Fruit	2, 3	37
Playing Store	2, 3	22
Pony Track, The	1, 2, 3, 4	51
Push Block	1, 2	6
Quoits	2, 3	15
Race-Track Addition, The	1, 2, 3, 4	39
Race-Track Division Drill	4	59
Race-Track Subtraction, The	1, 2	45
Recognition Game	1, 2	34
Red and Blue	1, 2, 3, 4	33
Return Ball	2, 3	23
Ring Toss	2, 3	21

GAMES — *Concluded*

NAME OF GAME	FOR WHAT GRADE	PAGE
Shepherd, The	1, 2	32
Silent Addition Drill	2, 3	39
Silent Multiplication	3, 4	48
Silent Subtraction Drill	1, 2, 3, 4	47
Speed Relay	1, 2	42
Spider and Fly	1, 2	31
Stagecoach	3, 4	50
Stepping Stones	1, 2, 3, 4	35
Store, The	3, 4	49
Tenpins	3, 4	53
Thinking Numbers	3, 4	22
Tit-Tat-Toe Puzzle	2, 3	12
Toss and Tell	1, 2, 3	28
Twentieth-Century Limited, The	1, 2, 3	20

RIMES

NAME OF NUMBER RIME	PAGE
Baa, Baa, Black Sheep	69
Barber, Barber, Shave a Pig	70
Day Is Done, The	65
Four and Twenty Tailors	76
Going to St. Ives	76
Hickory, Dickory, Dock	67
Miscellaneous Rimes	77–78
Old Mother Hubbard	68
Old Woman Who Lived in a Shoe, The	68
One and Two and Nine	68
One for the Money	76
One I Love	66

RIMES — *Concluded*

NAME OF NUMBER RIME	PAGE
One to Ten	66
One, Two, Three	66
One, Two, Three, and Four Legs	71
Rub-a-Dub-Dub	70
Seven Little Daisies	66
Sing a Song of Sixpence	71
Ten Little Pennies	72
Ten Yellow Dandelions	70
Ten o'Clock Scholar, The	76
This Little Pig Went to Market	65
Three Wise Men of Gotham	70
Twenty Little Chick-a-dees	74

SONGS

NAME OF NUMBER SONG	PAGE
Baa, Baa, Black Sheep	81
Chick-a-dee Song	94
Hickory, Dickory, Dock	83
Hippity Hop to the Barber Shop	87
Mother Goose Schottish	82
Muffin Man, The	90
Sing a Song of Sixpence	85
Ten Little Fingers	89
Ten Little Indians	88
Three Blind Mice	84
Two Little Bluebirds	86
Two Soldier Boys Go Marching By	92

SENSE-TRAINING EXERCISES

NAME OF EXERCISE	PAGE
Blind Man	105
Caller, The	105
Common Type Solids, The	99–100
Form and Color	102
Game to Teach Type Solids	100
Number Recognition	101
Sense of Hearing, The	102
Sense of Touch, The	104
Sense Test	106
Telephone	101

SPEED AND ACCURACY TESTS

NAME OF OPERATION	PAGE
Addition, Simple, Ex. 1, 2, 3	109–110
Addition, Column, Ex. 6	113
Addition, Ones and Tens, Ex. 5	112
Addition and Subtraction, Simple, Ex. 11	118
Addition and Subtraction, Large Numbers, Ex. 12	119
Subtraction, Simple, Ex. 4	111
Subtraction, Large Numbers, Ex. 10	117
Multiplication, Simple, Ex. 7	114
Multiplication, Ex. 9	116
Multiplication and Division, Ex. 8	115
Multiplication and Division, Ex. 13	120

GAMES FOR THE KINDERGARTEN

NAME OF GAME	PAGE
Bean-Bag Counting Game	4
Card Domino Game	9
Cat and Mouse	7
Catch and Say	44
Counting by 2s, 3s, 4s	48
Digits, The	5
Flash Card	10
Matching Game	18, 19

GAMES FOR GRADE 1

Addition Relay Race	44
Auto Race	9
Ball Toss	21
Baseball	40
Basket Ball	54
Bean-Bag Counting Game	4
Birthday Party	3
Bull's-Eye, The	6
Card Domino Game	9
Cat and Mouse	7
Catch and Say	44
Climbing the Stairs	5
Combination and Answer	26
Combination Building	29
Combination Race	38
Counting by 2s, 3s, 4s	48

GAMES FOR GRADE 1 — *Continued*

NAME OF GAME	PAGE
Cuckoo Clock, The	16
Days of the Week	30
Digits, The	5
Domino Game	27
Eating Watermelon	18
Firemen	17
Fish Pond	41
Flash Card	10
Flash-Card Drill Game	26
Fortune Wheel	16
Fox and Geese	31
Fruit Basket	20
Gathering Nuts	38
Guessing the Number	36
Guessing Reversed	36
Hall of Fame	36
Husking Bee	33
Matching Game	18, 19
Missing-Number Drill	46
My Family	41
Notation Drill	30
Number Building	27
Number Family	42
Number Spell Down	32
Partners	14
Partners — Subtraction	47

GAMES FOR GRADE 1 — *Concluded*

NAME OF GAME	PAGE
Pony Track, The	51
Push Block	6
Race-Track Addition, The	39
Race-Track Subtraction, The	45
Recognition Game	34
Red and Blue	33
Shepherd, The	32
Silent Subtraction	47
Speed Relay	42
Spider and Fly	31
Stepping Stones	35
Toss and Tell	28
Twentieth-Century Limited, The	20

GAMES FOR GRADE 2

Addition Relay Race	44
Auto Race	9
Bags in a Box	14
Ball Toss	21
Baseball	40
Basket Ball	54
Bean-Bag Combination Race	43
Birthday Party	3
Bull's-Eye, The	6
Climbing the Stairs	5
Combination and Answer	26
Combination Building	29
Combination Drill Game	12

GAMES FOR GRADE 2 — *Continued*

NAME OF GAME	PAGE
Combination Making	53
Combination Race	38
Cuckoo Clock, The	16
Days of the Week	30
Decades	61
Dodo	11
Domino Game	27
Eating Watermelon	18
Firemen	17
Fish Pond	41
Flash Card	10
Flash-Card Drill Game	26
Flash Sight Number Drill	62
Football Game	13
Fortune Wheel	16
Forty-five Combinations, The	24
Fox and Geese	31
Fruit Basket	20
Gathering Nuts	38
Grab Bag	23
Guessing the Number	36
Guessing Reversed	36
Hall of Fame	36
Hopscotch	8
Hunting Wild Geese	4
Hurdle Race	10
Husking Bee	33

GAMES FOR GRADE 2 — *Continued*

NAME OF GAME	PAGE
Missing-Number Drill	46
My Family	41
Newcomb	25
Notation Drill	30
Number Building	27
Number Family	42
Number Race	13
Number Spell Down	32
One Hundred-Yard Dash, The	28
Partners	14
Partners — Subtraction	47
Picking Fruit	37
Playing Store	22
Pony Track, The	51
Push Block	6
Quoits	15
Race-Track Addition, The	39
Race-Track Subtraction, The	45
Recognition Game	34
Red and Blue	33
Return Ball	23
Ring Toss	21
Shepherd, The	32
Silent Addition Drill	39
Silent Subtraction	47
Speed Relay	42
Spider and Fly	31
Stepping Stones	35

GAMES FOR GRADE 2 — *Concluded*

NAME OF GAME	PAGE
Tit-Tat-Toe Puzzle	12
Toss and Tell	28
Twentieth-Century Limited, The	20

GAMES FOR GRADE 3

Addition Relay Race	44
Auto Race	9
Bags in a Box	14
Ball Toss	21
Basket Ball	54
Bean-Bag Combination Race	43
Bouncing Ball	58
Combination and Answer	26
Combination Building	29
Combination Drill Game	12
Combination Making	53
Cuckoo Clock, The	16
Decades	61
Dodo	11
Domino Game	27
Eating Watermelon	18
Endless Chain, The	34
Factors Game	54
Firemen	17
Fish Pond	41
Flash Sight Number Drill	62
Football Game	13

GAMES FOR GRADE 3 — *Continued*

NAME OF GAME	PAGE
Foremen and Helpers	58
Fortune Wheel	16
Forty-five Combinations, The	24
Fox and Geese	31
Fruit Basket	20
Gathering Nuts	38
Grab Bag	23
Guessing Factors	55
Guessing the Number	36
Guessing Reversed	36
Gun Club	61
Hall of Fame	36
Hopscotch	8
Hunting Wild Geese	4
Hurdle Race	10
Husking Bee	33
Miscellaneous Drill	37
Missing-Number Drill	46
Mixed Combinations	56
Multiples	56
Multiplication Drill	48
Multiplying Down	52
Multiplication Wheel	52
My Family	41
Newcomb	25
Number Building	27
Number Race	13
Number Spell Down	32
One-Hundred-Yard Dash, The	28

GAMES FOR GRADE 3 — *Concluded*

NAME OF GAME	PAGE
Picking Fruit	37
Playing Store	22
Pony Track, The	51
Quoits	15
Race-Track Addition, The	39
Red and Blue	33
Return Ball	23
Ring Toss	21
Silent Addition Drill	39
Silent Multiplication	48
Silent Subtraction	47
Stagecoach	50
Stepping Stones	35
Store, The	49
Tenpins	53
Thinking Numbers	22
Tit-Tat-Toe Puzzle	12
Toss and Tell	28
Twentieth-Century Limited, The	20

GAMES FOR GRADE 4

Ball Toss	21
Bouncing Ball	58
Catching Mice	60
Combination Making	53
Eating Watermelon	18
Endless Chain, The	34

GAMES FOR GRADE 4 — *Continued*

NAME OF GAME	PAGE
Factors Game	54
Following the Leader	51
Football Game	13
Foremen and Helpers	58
Fraction Combination Race	59
Fox and Geese	31
Guessing Factors	55
Gun Club	61
Hall of Fame	36
Hunting Wild Geese	4
Hurdle Race	10
Husking Bee	33
Miscellaneous Drill	37
Mixed Combinations	56
Multiples	56
Multiples and Factors	50
Multiplication Drill	48
Multiplying Down	52
Multiplication Wheel	52
Number Spell Down	32
One-Hundred-Yard Dash, The	28
Pony Track, The	51
Race-Track Addition, The	39
Race-Track Division Drill	59
Red and Blue	33
Silent Multiplication	48

GAMES FOR GRADE 4 — *Concluded*

NAME OF GAME	PAGE
Silent Subtraction	47
Stagecoach	50
Stepping Stones	35
Store, The	49
Tenpins	53
Thinking Numbers	22

SUGGESTIONS FOR THE USE OF "NUMBER HELPS"

INTRODUCTION	123
THE KINDERGARTEN AND FIRST GRADE	125
I. Counting Through 100	125
II. Counting by 2s to 20; by 5s to 50	127
III. Reading Numbers Through 100	129
IV. Writing Numbers 0 Through 9	129
V. Type Forms	129
VI. Type Solids	130
VII. Beginning Measures	131
VIII. Addition Combinations Through 10	132
SECOND GRADE	135
I. Counting—Concrete and Abstract	135
II. Combinations—Work for Speed and Accuracy	136
III. Roman Numerals	138
IV. Addition	139
V. Ones and Tens	140
VI. Subtraction	142
THIRD GRADE	145
I. Reading and Writing Numbers to 1,000	145
II. Addition	147
III. Subtraction	147
IV. Austrian Method of Subtraction	149
V. Multiplication Tables—2s Through 12s	151
VI. Multiplication	153
VII. Measures	154
VIII. Telling Time	155
IX. Applied Problems	156

THE FOREWORD

Number Helps, which includes games, rimes, songs, sense-training exercises, and speed and accuracy tests, was prepared to provide teachers with attractive material which bases number work on the common experiences of the child in the home, in the school, and on the playground. The material presented in this book relates numbers to play in a practical and interesting way and will, when wisely used, facilitate the approach to the further study of numbers and increase interest in the study.

Most of the child's waking hours before he enters school have been devoted to play. It is essential that the transition from play to work should be made gradually so that the child may not look upon school work as drudgery, but rather as a different kind of activity in which he finds pleasure. It is of importance that the concept of numbers be developed through activities which appeal strongly to the child and which are valuable in his later years. It is to be noted that the manner in which numbers are developed in this book not only associates the child's first knowledge with pleasant activities, but develops the ability to think in situations which involve number relations.

The material here presented furnishes an appeal to the play interests of the child; it stimulates attention, alertness, and concentration; and it aids in the development of speed and accuracy. The material has been selected with great care, and its use should be continued at least through the kindergarten and the first four grades.

The authors have had long and intimate association with thousands of boys and girls, and the number facts and relationships are presented in such a way that they make a strong appeal to children.

The material of this book has been used with a great deal of pleasure and profit by thousands of pupils. Teachers everywhere commend it.

The rimes, songs, sense-training exercises, and many of the games may be used by the mother in the home. The authors have adapted parts of the material to the pre-school years of the child's life in order that the active, alert, restless, inquiring child-mind may have attractive and instructive material by which the number-sense may be stimulated and satisfied, and that there may be available suitable material for those who have felt the need of such a volume.

This little volume is dedicated to the pleasure and profit of the boys and girls of the home, the kindergarten, and the lower grades.

THE AUTHORS

PART I. NUMBER GAMES

The number games here presented have been selected from several hundred of the best games used in various schools throughout the country. Every game presented has been tried out to test its value as a real aid to number teaching.

The games have not been printed in the order in which they should necessarily be used. Many of the games are very simple and easy as presented, but may be adapted to make them more complicated and difficult as the needs of the children may demand. The authors have attempted to select the games which would not only function in the teaching of numbers, but which would also stimulate originality in adapting the games to the uses of various schools and classes.

Many of these games have satisfactorily stood the test of home teaching as well as the test of the classroom.

NUMBER HELPS

Birthday Party

Directions. The teacher starts a story, such as, "Ruth had a birthday party. She invited 6 girls and 5 boys."

A child continues, "Ruth had 11 children at her party — 6 and 5 are 11."

The teacher goes on, "Her cake had 5 yellow candles and 4 red candles."

A child continues, "Her cake had 9 candles — 5 and 4 are 9."

The teacher proceeds, "The children played 3 games before lunch and 4 games after lunch."

A child goes on, "The children played 7 games — 3 and 4 are 7."

The story may be continued by telling about the gifts, recitations, songs, candies, and fruit.

Hunting Wild Geese

Number playing. Any number, one at a time.

Directions. Use as a bullet the number selected for special drill, as 6. Children in turn kill as many geese as they can by adding 6 to the number of each goose, or by multiplying the number of each goose by 6.

By changing the numbers, the game may be used for drill in addition, subtraction, or division.

Bean-Bag Counting Game

Number playing. The class by rows and a leader.

Material. One or more bean bags.

Directions. The leader faces a row and tosses the bean bag to each child in turn. Each child tosses the bean bag back to the leader. Children count in rhythm as the bag is tossed.

This game may be varied by having two or more rows playing at the same time or by forming a circle with the leader at the center.

The Digits

Number playing. Class in groups of ten.

Material. Cards numbered from 0 to 9 inclusive. Use at least two sets of cards.

Directions. The teacher shuffles the ten cards and hands one to each of ten children in each group.

See how quickly each can find his place in the line, at the front of the room. When he steps into line, he holds his card in front of him so that the class may see if the figures are in the correct order, as:

0 1 2 3 4 5 6 7 8 9

The group that first arranges itself correctly wins.

The ten children in each group then repeat their numbers in order.

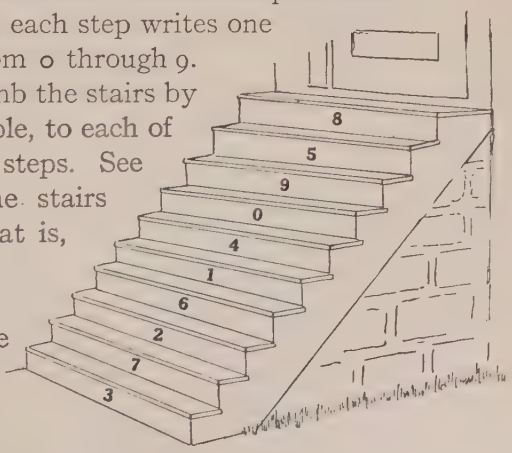
These cards may be used to build numbers of two or more digits.

Climbing the Stairs

Directions. The teacher draws 10 steps on the blackboard, and on each step writes one of the numbers from 0 through 9.

Have a pupil climb the stairs by adding 4, for example, to each of the numbers on the steps. See who can climb the stairs without falling (that is, without making a mistake).

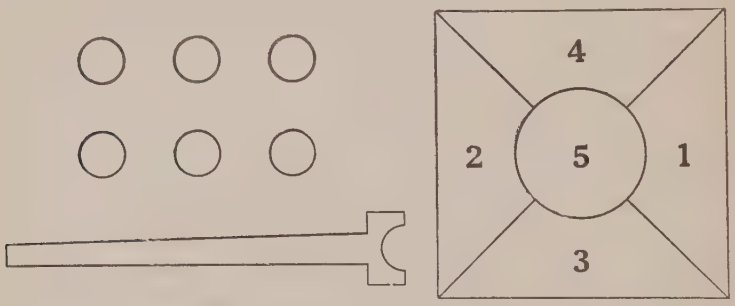
See who can come down the stairs as fast as he goes up.



Push Block

Number playing. Two teams.

Material. Six flat wooden discs 1½ inches thick and 3 inches in diameter; also a push bar about 4 or 5 feet long. The goal is drawn on the floor.



Directions. Select from the class two teams, six players on each team.

Place the 6 discs about 10 or 12 feet from the goal, as space will permit. In turn, each of the six players of team No. I has one chance to shove a disc toward the goal. If the disc touches a line of the goal, it counts in the lowest space bounded by the line. If it touches an outside line, it counts nothing. After the score is recorded, team No. II plays.

A teller from each side may keep the score.

A circular goal may be used.

The Bull's-Eye

Material. Three small bean bags.

Directions. On the floor make a target consisting of a "bull's-eye" about 8 inches across, with two circles drawn about it, one circle 18 inches, and the other 30

inches, in diameter. The player should stand on a line about 8 or 10 feet from the target.

Divide the class into two equal teams. Choose a scorer and an attendant to care for the bags.

Alternating, the children from either team take their places on the line and try to hit the bull's-eye, which counts 5. Each bag within the inner circle counts 3, and between the inner and outer circle 2. Record each player's score. The team with the highest score wins.

Cat and Mouse

Directions. The mice form in a circle; the cat stands outside the circle. Each mouse holds a flash card.

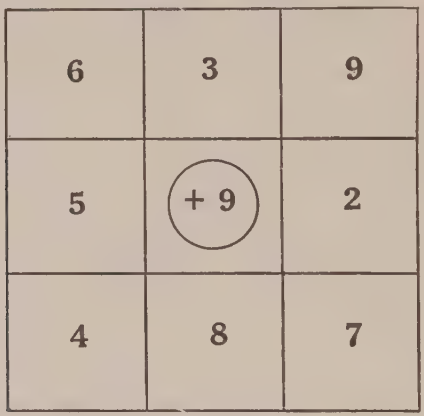
The cat taps a mouse on the head. This child counts as high as the flash card indicates. If the number is 6, the child counts 1, 2, 3, 4, 5, 6.

The cat continues running around the circle, tapping the mice until one makes a mistake. The child who makes a mistake takes the place of the cat.

Continue the game until sufficient drill in counting has been given.

Hopscotch

Directions. Draw a square on the blackboard. Divide it into nine equal small squares, and write a figure in each. Draw a circle around the figure in the center.



Divide the class into two equal groups. Alternating sides, each child in turn finds the sum of all the figures around the Hopscotch, using 9 as the first addend each time, but beginning to add at different places on the Hopscotch.

For example:

Beginning, 9+5: 14, 20, 23, 32, 34, 41, 49, 53.

Beginning, 9+6: 15, 18, 27, 29, 36, 44, 48, 53.

This game may be adapted to subtraction by making the center number larger than the sum of all the numbers around the Hopscotch. Each number may be subtracted from the last remainder.

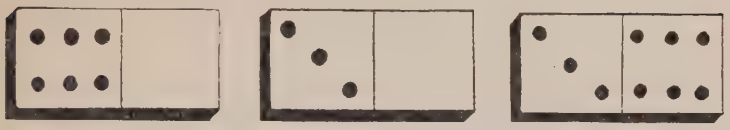
For example, use 49 as the center number:

Beginning, 49−5: 44, 38, 35, 26, 24, 17, 9, 5.

Beginning, 49−6: 43, 40, 31, 29, 22, 14, 10, 5.

Card Domino Game

Material. Set of domino cards.



Directions. Place on the board numbers corresponding to the dots on the dominoes. Match the numbers with the domino cards to teach number recognition.

Step I. Match the dominoes without mentioning the numbers.

Step II. Match the dominoes by calling the corresponding numbers.

Auto Race

Number playing. A row, group, or class.

Directions. Assign the name of an auto to each child in the group, or let each choose the name of an auto, as: Reo, Buick, Ford, Dodge, Cadillac, etc.

Place on the board a row of combinations, as:

6	5	9	3	6	5	4	7	8	9	4	6
5	9	6	2	7	3	6	2	3	7	8	2
–	–	–	–	–	–	–	–	–	–	–	–
8	7	8	5	4	3	8	2	4	1	8	9
9	4	6	7	5	7	5	9	3	9	7	4
–	–	–	–	–	–	–	–	–	–	–	–

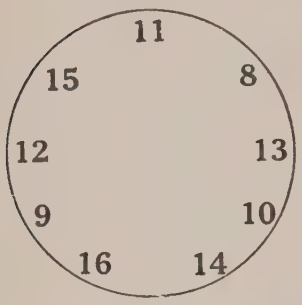
These combinations represent the race course.

If you desire a short race, use one row; if a long race, both rows. More combinations may be used.

See which auto will win the speed test. Keep the time in seconds for each auto.

Hurdle Race

Number playing. The class, two at a time.
Material. Two pointers.



5+6	5+7
4+5	9+7
7+8	6+4
5+3	8+6
7+6	

Directions. Draw a large circle on the blackboard and write the sums of combinations to be drilled. Write also the combinations without answers on the board.

Divide the class into two equal teams. Select a child from each team for the race. Each racer tries to be the first to touch the correct sum in the circle as the teacher calls the combination. The one touching it first jumps the hurdle and scores a point. Have the score kept on the blackboard.

After five combinations have been given, two new racers take a turn.

This game may be adapted to subtraction, multiplication, or division.

Flash Card

Number playing. Entire class.

Material. A set of flash cards may be made by pasting colored squares or circles on cards.

Directions. Each of two children picks a card from the pack. For example:

The children stand side by side. A child chosen from the class gives the example orally, as: $4+5=9$.

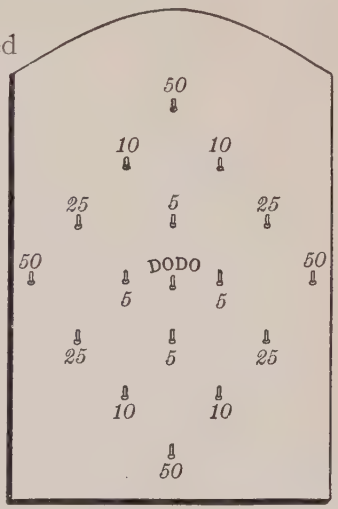
This game may be used for seat work by cutting up similar small cards and placing them in trays with answer cards in figures.

Dodo

Number playing. Any number, one at a time.

Material. A Dodo board and a set of 6 rubber rings (heavy jar rings).

Illustration. Hooks are placed on the board as illustrated in the diagram. The hooks project an inch from the board.



Directions. Divide the class into two equal groups and keep score. Each player in turn stands 10 feet from the board and tosses 6 rings.

The hooks are marked 5, 10, 25, 50. The one in the center is marked Dodo.

If a ring catches on Dodo, it cancels the value of the other five rings. If no ring catches on the Dodo hook, add the numbers for all of the rings which have caught on hooks. This gives the score for each player.

Tit-Tat-Toe Puzzle

Number playing. Entire class.

4	9	2
3	5	7
8	1	6

Directions. The teacher draws on the blackboard a figure as shown in the acompanying illustration, but omitting the numbers in the spaces. Pupils will copy the diagram on their papers. The object of the game is to fill in the spaces with the numbers from 1 to 9 inclusive so that if the three numbers are added vertically, horizontally, or diagonally the sums will be 15. Have each pupil turn in his paper as soon as he has worked out the puzzle so that the others may not get the key from him.

Combination Drill Game

Number playing. Entire class.

Material. Make a set of flash cards displaying various numbers of small squares or circles.

Directions. Arrange cards on chalk tray. Teacher mentions any one sum, as: 8. A child points to two cards, as: 5 and 3. He then repeats his combination, as: $5+3=8$.

The child may be asked to point to all the combinations which make 8, as: $4+4$; $7+1$; $6+2$.

Number Race

Number playing. Class by two's.

Directions. Write combinations in addition, subtraction, multiplication, or division across the front of the board, as:

A 2 7 8 3 6 5 2 3 6 8 0 4 9 3 7 8 9 7 6 4 B
9 6 7 9 6 3 3 4 2 9 4 7 6 7 2 3 4 8 5 5
– – – – – – – – – – – – – – – – – – – –

Two children are chosen to run the race. At the given signal, one child starts at A and the other at B.

The winner is the one who finishes the greater number of examples correctly by the time they meet.

The class watches for mistakes so that each child is prepared to go to the board and make corrections.

Football Game

Number playing. Two teams of eleven each (Yale and Harvard), teacher as referee, and a scorer.

Directions. Name the members of each team, *a, b, c, d, e, f, g, h, i, j, k.*

Write on the blackboard the combinations you wish to use in the drill.

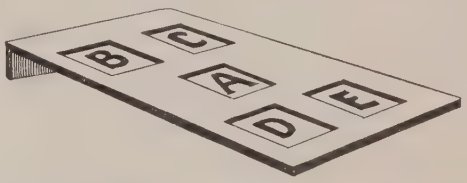
As the teacher points to the combinations, she calls a letter, as: *f.* If *f* on the Yale team gives the answer first, he makes a gain. If the members on the Yale side give the answer first four times in succession, they make a "first down." If they make three first downs, they make a "touchdown" which counts 6. If the members on the Harvard team give any combination first, it is their ball and they try to make four gains for a first down, etc.

Bags in a Box

Number playing. The class.

Material. Four small bean bags and a board made from a heavy pasteboard box as shown in the illustration. Cut five holes in the board.

Assign a different value to each hole. Assign a larger value to the smaller holes. Change the values according to the combinations to be taught.



Directions. Divide the class into two equal groups. At about 8 or 10 feet from the box make a line where the player must stand.

Choose a scorer and an attendant to care for the bags.

A player from one side tosses the four bags, one at a time. A bag thrown into the hole marked E counts 1; one thrown into D counts 2; one thrown into C counts 3; one thrown into B counts 5; and one thrown into A counts 10.

After the four bags are thrown, the score is recorded, and a player from the other side throws. The side having the highest score wins the game.

Partners

(Addition drill. Combinations to 10)

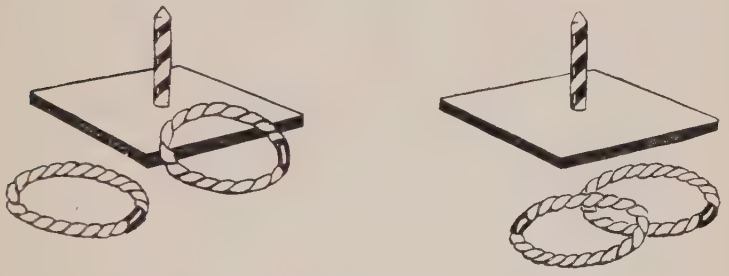
Number playing. Eleven. The remainder of the class indicate a mistake by one clap of the hands.

Material. Small cards numbered from 0 through 10.

Directions. Pass cards to eleven pupils. One of the eleven runs to the front of the room saying, "I'm 6. Who's my partner?" The child holding 4 rises and says, "I'm your partner—6 and 4 are 10."

This game may be used with larger combinations.

Quoits



Number playing. Four at a time in partners.

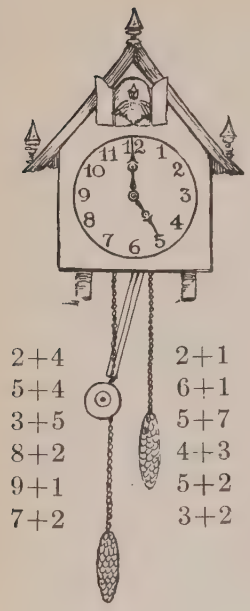
Materials. Two wooden pegs and four rope quoits (two for each side).

Directions. A member of each team stands at each of the two pegs and throws the quoits toward the opposite peg. If a ringer is thrown, it counts 5 for that side. If a leaner is thrown, it counts 2. If each side throws a ringer, they cancel each other.

The ring nearest the peg counts 1. If both rings thrown by one player are nearer, they count 1 each.

The partner of the last winner throws first from the other peg.

A teller may announce the score, or all may keep score.



The Cuckoo Clock

Directions. The teacher draws a clock and combinations on the board and says: "Who can make the cuckoo sing? Charles, try." As the teacher points, Charles says: "Two and 1 are 3, 2 and 4 are 6, 3 and 2 are 5," etc.

After five correct combinations, the class sings, "Cuckoo, cuckoo."

If a child makes a mistake, another child is given a chance.

This exercise may be made a contest by having the pupils choose sides and having players from either side alternate. Have a scorer.

Fortune Wheel

Number playing. A group of ten and a leader.

Directions. Arrange the ten children in a circle, giving each a number, from 1 through 10.

The leader stands at the center and says, for example, "5 plus 2." "Seven" raises his hand and says, "5 and 2 are 7." If he fails, he steps back from the circle. In order to return to the circle, he must give his own answer at the proper time or be the first to correct the mistake of another.

More difficult combinations may be used for more advanced pupils. The game may be used for drill in subtraction, multiplication, and division.

Firemen

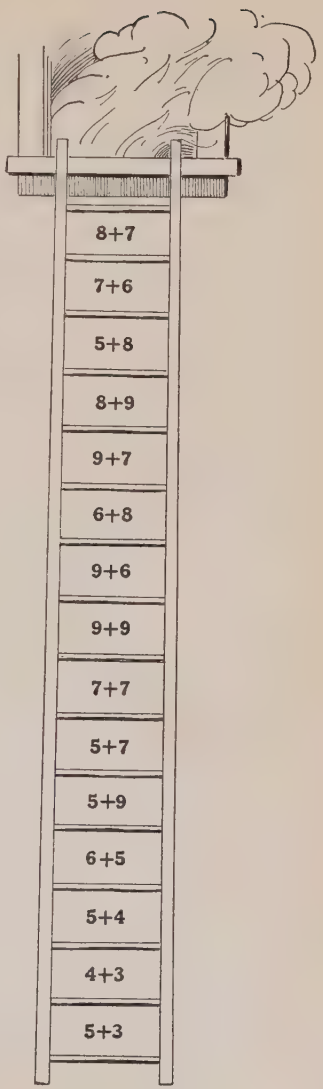
Number playing. The class, one at a time.

Directions. Divide the class into two fire companies. Draw on the blackboard a picture of a house with a ladder up to the window, with number combinations written between the rungs of the ladder.

A brave fireman tries to get to the top of the ladder by giving the correct answers to all the combinations, as fast as he can. If he makes a misstep, down he goes, and a fireman from the other company takes his place.

Keep score. Score 1 each time a fireman reaches the top of the ladder.

This game may be made a contest among the members of the class instead of between teams by allowing the pupils to see who can get to the top of the ladder in the shortest time. It may be made more difficult by the use of three-figure combinations.



Eating Watermelon

Number playing. As many as there are pieces of watermelon drawn on the board.

Material. Drawing of a watermelon divided into six or more pieces. Figures are written on the pieces to represent seeds, as shown in the illustration.

Directions. Add to the numbers (seeds) any number selected (+7 for special drill) (see illustration). See which row or group can eat the melon in the shortest time by giving the correct answers for all the combinations.

This game may be used for addition, subtraction, multiplication, and division, with combinations as difficult as desired.

Matching Game

Number playing. Entire class.

Material. Domino pictures, words, figures, and Roman numerals, written on flash cards as shown on page 19.

Directions. The teacher holds the cards of Set I and distributes the other three sets among the children. She places one card of Set I on the tray. The children who have the corresponding word, number, or Roman numeral go to the front and place their cards on either side of the word. Each child should state what is on his card; for example: "I have the word four," "I have the Roman numeral IV," "I have the figure 4."

All of one set of cards may be placed on the chalk tray and the children may go to the front of the room, one at a time, and match their cards with those on the tray.

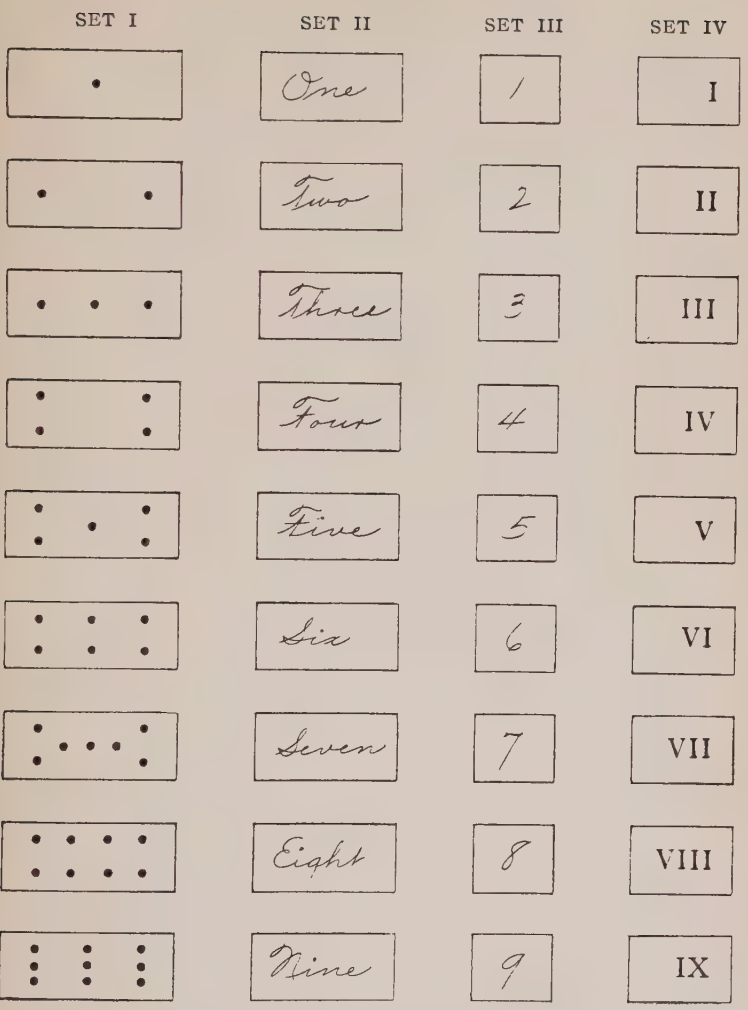


Illustration for Matching Game

The Twentieth-Century Limited

Number playing. The class, one at a time.

Illustration. Draw a railroad track with combinations on each of the ties. Place the names of well-known cities along the way.

Directions. Make a rapid trip from one city to another by giving the answers to the combinations as quickly as possible: New York to Cleveland, Philadelphia to Pittsburgh, St. Paul to Omaha, Denver to San Francisco, Kansas City to Los Angeles.

This game may be used for a drill in addition, subtraction, multiplication, or division, with combinations as difficult as desired.

Fruit Basket

Number playing. Small group and one pupil who is "It."

Directions. Each one playing is given the name of a fruit, also a number. The pupils form a circle with the leader in the center. The leader calls the names of two fruits, as: "Apples and peaches." The pupils whose fruits are called say their numbers and then change places. The one who is "It" tries to get one of the vacant places, but must give the sum before he starts. The one left out becomes "It."

Ball Toss

Number playing. A row, a group, or the entire class.
Material. A ball.

Directions. A leader tosses the ball to any pupil in the group, giving a combination, as: $2+7$. The pupil catches the ball and tosses it back, giving the answer. If the pupil gives the correct answer, he makes a score. If he makes a mistake, he is out.

The game may be played by choosing sides or using a row for each side. Keep the ball on one side until there are three outs. When one side makes three outs, the other side has its turn.

This game may be used for addition, subtraction, multiplication, or division. The combinations may be made as difficult as desired.

Ring Toss

Number playing. The class, two equal rows at a time.
Material. A stake 6 inches high, set in a board about 10 to 12 inches square. Six rings (use embroidery hoops).

Directions. The first player in the first row, standing at a distance of 10 or more feet, tosses three hoops, one at a time, at the stake. Each time he rings the stake, he scores 3. The score is credited to his row. The first player in the second row takes his turn, and so on. The row having the largest score wins the game. All pupils at their seats keep score and find the total at the close of the game.

The value of a ringer may be changed according to the table being taught.

Thinking Numbers

Number playing. Any number, one at a time.

Directions. The teacher says: "I am thinking of 27.

"What figure is in the **one's** column?

"If I change **one's** figure to **ten's** place and **ten's** figure to **one's** place what number do I have?

"If I change ten's figure to 8 what number do I have?

"If I change one's figure to 6 what number do I have?

"If I subtract 2 from one's figure what number do I have?

"If I divide the number by 3 what number do I have?

"If I multiply the number by 2 what number do I have?"

The teacher may vary this exercise as desired.

Playing Store

Number playing. The class.

GROCERY PRICE LIST

Orange	each	5¢	Sugar	per lb.	9¢
Bread	per loaf	8¢	Oatmeal	per lb.	6¢
Crackers	per box	12¢	Raisins	per box	11¢
Starch	per lb.	7¢	Salt	per bag	9¢
Matches	per box	4¢	Apples	each	2¢

Directions. Copy on the blackboard the price list, based on local prices.

"Choose up" or divide the class into two equal groups.

Sell the number of quarts, pounds, boxes, or articles corresponding to the table you wish to teach.

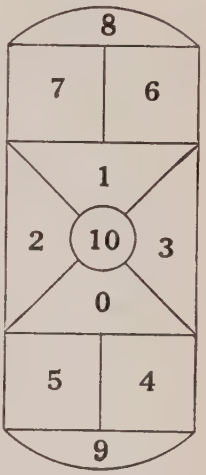
When the table of 3s is studied, find the cost of three of each article given in the list.

Change the list often, using current prices. Make drug-store, dry-goods-store, confectionery, and fruit-store lists.

Return Ball

(For drilling two, three, four, five number combinations)

Number playing. Any number, one at a time. The teacher acts as referee.



Material. A rubber ball with an elastic cord.

Directions. The player stands at a convenient distance from the diagram drawn on the blackboard. He throws the return ball at the diagram, holding the elastic cord so that the ball comes back to him.

The pupils at their seats keep score, adding the numbers which he hits. If two number combinations are being drilled, he has two throws; if three number combinations, he has three throws, etc. If the ball strikes a line, count the number in the space having the lower value.

The same device may be used for multiplication. If you wish to teach the table of 4s, multiply each number hit by 4, etc.

Grab Bag

Number playing. Whole class, one at a time.

Material. Small cards with numbers from 1 to 10 printed on them. There must be enough for a class.

Directions. The cards are placed on a small tray. Each child in turn draws out a card and writes on the board all the combinations whose sum is that number.

If a child is unable to give the combinations, other members of the class must be ready to give them.

The 45 Combinations

1	1	1	1	1	1	1	1	1
1	3	2	5	4	8	6	9	7
2	2	2	2	2	2	2	2	
4	2	3	6	5	8	7	9	
3	3	3	3	3	3	3		
4	3	7	5	6	9	8		
4	4	4	4	4	4			
6	7	4	8	9	5			
5	5	5	5	5				
7	9	8	6	5				
6	6	6	6					
8	9	6	7					
7	7	7						
9	8	7						
8	8							
9	8							
9								
9								

Directions. Make flash cards 3½ inches by 6 inches for the above combinations and their reverses.

The combinations with 1 and 2 make up Set I, those with 3, 4, and 5 make up Set II, those with 6, 7, 8, and 9 make up Set III.

Drill sets in order until the children respond instantly. Use also the zero combinations, as:

0	9	4
8	0	0

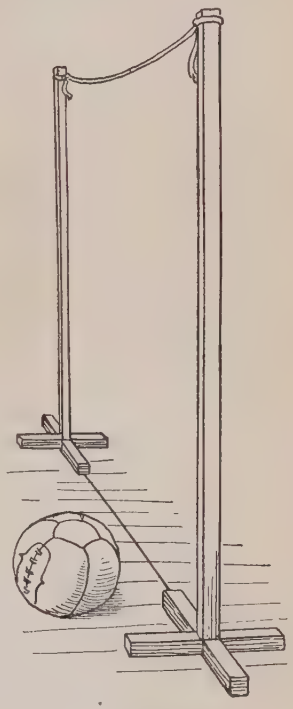
For review a fourth set of cards may be made of the difficult combinations printed in heavy type in the drill on page 24. Use also the combinations with zero.

Newcomb

Number playing. A group of ten or more on each side. Teacher acts as referee.

Material. A football, basket ball, or other large inflated ball.

Directions. Draw a line across the floor or use a row of desks to separate the sides. Stretch a rope or net with the top 6 feet above the floor over the line or desks.



The ball is given to a child on one side. Just as he throws it over the rope he calls the name of a child on the other side (John) and the teacher gives a combination, as: 5 and 6. John must not touch the ball until he gives the answer. If he answers correctly his side scores one point.

If the ball touches the floor, or if the answer given is not correct, it counts one for the side which threw the ball. If either side throws the ball under the rope, it counts one for the other side.

The game may be played out of doors or in a room. Pupils not playing keep score.

Flash-Card Drill Game

(To drill combinations to 10)

Number playing. Class or group.

Material. Flash cards numbered to 10.

Directions. The teacher flashes a card; for example, 5. The children have time to think of all the combinations that make 5. One child is called to give as many such combinations as he can, as: 1 and 4 are 5; 3 and 2 are 5.

Other members of the class give combinations omitted.

This game may be used for larger addition combinations and for subtraction, multiplication, or division.

Combination and Answer

Number playing. The class in three equal groups.

Material. Set of combination cards. Set of reverse combination cards. Set of answer cards for combinations.

Directions. Distribute answer cards to one group, combinations and reverses to other groups.

The first child with answer card goes to the front of the room and holds his card so that all may see.

The children who have the corresponding combinations hold up their cards as they take their places at either side of the first child.

Each child repeats his combination with answer, as: $2+3=5$; $3+2=5$; $4+1=5$; $1+4=5$; $0+5=5$; $5+0=5$

A second child with answer card then takes his turn.

Number Building

Number playing. The entire class.

Materials. Flash cards 5 by 8 inches with a figure printed on each, as: 3, 5, 6, etc.

Directions. The teacher says: "You may add to 8 [for example] each number as I flash it." A child answers: "8 and 3 are 11, 8 and 4 are 12," etc.

Later the answer only may be given.

This exercise may be adapted to addition, subtraction, multiplication, division, and fractions.

Domino Game

Number playing. Row at a time.

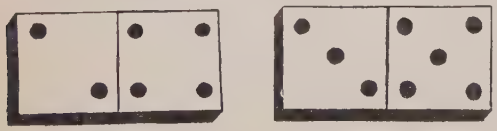
Material. Colored circles pasted on cards to represent dominoes.

Directions. Arrange domino cards in chalk tray. Children in turn give sums of circles on dominoes, as:

4+3=7

The winner is the child who gives the greatest number of correct answers.

This game may be made more difficult by requiring the child to give the sum of two dominoes, as:



6+8=14

The 100-Yard Dash

Number playing. Class or group.

Illustration. Ten addition examples are written on the blackboard as follows:

6	9	6	7	1	3	2	4	2	8
0	4	7	5	9	7	9	7	5	3
3	2	0	4	8	0	5	9	3	6
4	3	2	3	2	4	3	1	7	0
5	7	4	8	6	8	6	3	9	7

Directions. A pupil starts at the signal "go" and gets the answers as fast as he can.

The teacher will keep time to see who can run the 100 yards in the least number of seconds.

If the pupil makes a mistake, another takes his place.

The numbers may be frequently changed to prevent the writing of sums from memory.

Toss and Tell

Number playing. Leader and class.

Material. One bean bag.

Directions. The leader gives a combination, as 7+9, as he tosses the bag to any child. The child who catches the bag tosses it back to the leader, giving the answer, 16. If the answer is incorrect, the leader tosses the bean bag to another child without repeating the combination.

The remainder of the class watch for mistakes and indicate the mistakes by one clap of the hands.

This game may be used for addition, subtraction, multiplication, or division.

Combination Building

Place the combinations below on flash cards and use them for rapid drill.

1	1	1	1	1	1	1	1	1
—	—	—	—	—	—	—	—	—
2	5	4	9	3	7	10	6	8
2	2	2	2	2	2	2	2	2
—	—	—	—	—	—	—	—	—
8	5	4	7	11	9	10	6	3
3	3	3	3	3	3	4	4	4
—	—	—	—	—	—	—	—	—
9	8	6	7	11	12	9	13	10
4	4	4	5	5	5	5	5	6
—	—	—	—	—	—	—	—	—
11	12	8	10	12	14	13	11	12
6	6	6	7	7	7	8	8	9
—	—	—	—	—	—	—	—	—
13	14	15	16	19	15	16	18	19
7	9	10	1	10	7	8	3	10
—	—	—	—	—	—	—	—	—
14	18	12	11	13	10	11	12	14
0	10	6	8	7	0	9	10	6
—	—	—	—	—	—	—	—	—
9	15	16	8	17	7	17	18	6

Notation Drill

This drill should precede writing of numbers of three orders.

Number playing. Class by groups.

Material. Three or four sets of cards, each set numbered from 0 to 9 inclusive.

Directions. The teacher places the number cards on a table or desk and says: "Tom, Mary, and George may make the following number: seven hundred forty-two." The three children go to the table and each selects his number in the order that his name is called. A child is selected to write the number on the board, check the order, and read the number.

Other numbers may be formed by changing the order of the children.

Days of the Week

Number playing. Seven at a time, one of whom takes the part of the teacher.

Material. A soft ball.

Directions. Assign to each of the seven children the name of a day of the week.

Six children stand in a row, but not in order.

The child taking the part of the teacher bounces the ball, calling for a day of the week without mentioning its name, as: "The first day of the week." "Sunday" should catch the ball and bounce it back, saying: "I am Sunday, the first day of the week."

When a child fails to respond, he goes to the foot of the row. If the teacher fails to catch the ball, the one at the head of the row takes the place as teacher. If all

catch the ball without a mistake, the children not playing clap for them.

The same plan may be used for the months. In this case, the child should answer, for example: "I am June, the sixth month. I have 30 days."

Fox and Geese

Number playing. Small group.

Directions. The group forms a circle with the teacher or a pupil at the center. The children are the geese and the teacher is the fox.

The teacher gives such combinations as: 4 plus 3, 6 minus 2, 4 and how many are 10, 8 minus 3. If a player makes a mistake, he is caught by the fox and must go to the den within the circle. The geese may take their places in the ring again by correcting mistakes.

This game may be used for addition, subtraction, multiplication, or division, or with combinations of any.

Spider and Fly

Number playing. Class or group.

Material. Several sets of cards numbered from 1 to 10.

Directions. The children form a circle and each is given a card.

One child represents a spider and stands at the center. The spider holds up his card, a 5, for example, and taps one of the flies. The fly adds his number, 6, to the number which the spider holds, and says: "6 and 5 are 11."

If a fly makes a mistake, he is caught. He must take his seat and write the combinations and answers as they are given in the circle.

Number Spell Down

Number playing. Two rows, two groups, or the class divided into two equal sides.

Material. Number combinations on flash cards.

Directions. The teacher flashes the combinations and the pupils of the two sides alternate in answering. When a pupil makes a mistake, he sits down and writes the answers to the combinations as they are flashed.

This is continued until all from one side are seated.

The combinations may be given orally if no flash cards are available.

The game may be used for drill in addition, subtraction, multiplication, or division.

The Shepherd

Number playing. The class.

Directions. The children form a circle. A number is assigned to each child. One child is chosen as the shepherd.

The shepherd, passing quickly around the circle, touches some one and asks: "Have you seen my sheep?" The one questioned replies: "How many sheep have you lost?"

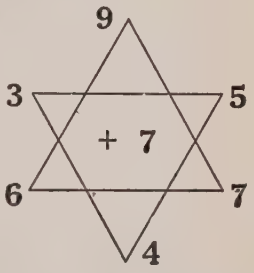
The shepherd says: "I have lost 5 white sheep and 3 black sheep." The player who has the number corresponding to the number of lost sheep says: "I saw 8 sheep." If he responds correctly, he may change places with the shepherd. If the player fails, the shepherd must try another combination.

A list of the combinations answered incorrectly should be placed on the blackboard and used later for special drill.

Red and Blue

Number playing. Two equal groups.

Directions. The class is divided into two equal groups, one called the Reds and the other the Blues.



The teacher points rapidly to the several numbers at the points of the star. The number to which she points is to be added to the one in the center. The sides alternate in answering.

If a mistake is made by one side and corrected by the other, it counts as an error for the side which makes the mistake. Each correction counts as one score. Each time all on a side answer correctly, 3 additional points are given.

This game may be used in addition, subtraction, multiplication, or division, with the combinations as difficult as desired. It may also be used with fractions.

Husking Bee

Number playing. The class or a group, one at a time.

Illustration. A cornfield with shocks of corn having number combinations written on them.

Directions. As the teacher points to the number combinations, the huskers answer.

This game may be used for drill in addition, subtraction, multiplication, or division, with combinations as difficult as desired.

This exercise may suggest others, as: "Hauling Wheat," "Gathering Sap in the Maple-Sugar Camp," "Gathering Pumpkins," "Picking Apples," etc.

Recognition Game

Number playing. The class.

Material. Domino cards made from cardboard or heavy paper, and cards with Roman numerals corresponding to the number of dots on the domino cards.

Directions. Divide the class into two groups. Give a domino card to each child in one group, and a card with a Roman numeral to each child in the other group.

The first child in the group with the domino cards flashes his card for an instant.

The child in the other group holds up the Roman numeral corresponding to the number displayed on the domino card. If he shows the correct number, his group scores 1. If his answer is incorrect, the next child in the first group writes the correct number on the blackboard. The side making the mistake gets an out.

The next player displays his card and the child on the opposite side having the corresponding numeral shows his number.

When three outs are made, the sides exchange cards and continue the game.

At the close of the game, the side having the largest score wins.

The Endless Chain

Number playing. The class.

Material. On each of a number of cards, write a simple example in addition, subtraction, multiplication, or division:

$3+5$ $7-5$ 3×4 $\frac{1}{3}$ of 6

Directions. The children form an "endless chain," a circle joining hands, with the teacher in the center. The

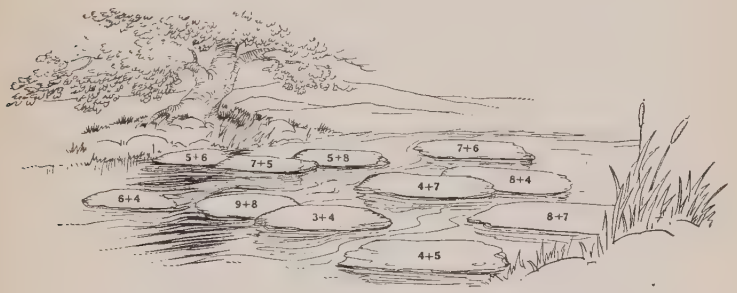
teacher flashes the cards, one at a time, so all may see them. Each player in turn must quickly give the result of his example.

When a child fails, the chain is broken, and the children on each side of him unclasp hands with him. The broken link must go within the circle. If he can give the correct answer when another player fails, he may return to his place in the chain.

Stepping Stones

Number playing. Any number, one at a time.

Illustration. A creek with stones in it. Number combinations written on the stones.



Directions. The combinations may be made easy or difficult. Cross the stream by answering the combinations. Warn the children to be careful that they do not make a misstep and fall into the water.

The game may be used for addition, subtraction, multiplication, or division, and may be varied to meet the needs of the class.

Hall of Fame

Number playing. Class, row, or group, one at a time.

Material. Crayons of various colors.

Directions. The teacher draws the Hall of Fame with a large number of steps leading up to it with number combinations written on each step. Place the more difficult combinations near the top. See who can reach the Hall of Fame by answering all combinations correctly.

This game may be used for addition, subtraction, multiplication, or division combinations as needed.

If the child can get up to the Hall of Fame, his name is written there with colored chalk of his own choice.

Guessing the Number

Number playing. Entire class.

Directions. Each child thinks of a number within a given limit.

John is the leader and says: "Mary, are you thinking of 2 and 5?" Mary answers: "No, I am not thinking of 7." John asks: "Rose, are you thinking of 9 less 5?" Rose answers: "Yes, I am thinking of 4."

Guessing Reversed

Number playing. Entire class.

Directions. The leader says: "I am thinking of two numbers that make 12."

The leader calls a child by name.

The child asks: "Are you thinking of 5 plus 7?"

The leader answers: "No, I am not thinking of 5 plus 7."

The child asks: "Are you thinking of 9 plus 3?"

The leader answers: "Yes, I am thinking of 9 plus 3—9 plus 3 are 12."

This game may be made more difficult by using larger numbers. It may also be used for drill in subtraction, multiplication, or division.

Picking Fruit

Number playing. Class or group.

Material. Cards numbered from 0 to 10.

Directions. The children form a circle. The teacher gives a number card to each pupil.

The leader stands at the center and makes up a story, as: "I picked 3 apples from one tree [choosing the child holding card 3] and 5 apples from another tree [choosing the child holding card 5]. How many apples did I pick, Tom?"

Tom answers: "Three apples and 5 apples are 8 apples."

This game may be varied by going to the store for groceries, to the garden for vegetables and flowers, etc.

Miscellaneous Drill

Number playing. The entire class.

Material. Flash cards with various number combinations in addition, subtraction, multiplication, division, fractions, or denominate numbers.

Directions. The teacher shuffles the cards and flashes them one at a time.

At first you may use only addition, then subtraction, etc., and finally mixed cards, as:

$3+4=$ $5-1=$ $10\div 2=$

$\frac{1}{2}$ of $12=$ 1 yard = ? feet, etc.

Gathering Nuts

Number playing. The class.

Material. Four-inch ellipses, cut from pasteboard, represent the nuts. On each nut write a combination.

Directions. Sketch two trees some distance apart on the blackboard. Place the nuts with blank sides toward the class on the chalk tray.

Divide the nut gatherers into two groups. The children gather nuts by going to the board, picking up the cards, and giving correct answers. The sides alternate.

The teacher decides how many nuts each may pick up, for example: three. If a child misses one of his combinations, he must stop, and his opponent begins.

The score of the number of nuts gathered by each side is kept on the board, and the side gathering the greater number wins the game.

Combination Race

Number playing. Class by groups.

Material. Set of combination cards.

Directions. Place the cards on the chalk tray.

The teacher selects several children to stand in a row facing the board. There should be one more child than there are cards for answers.

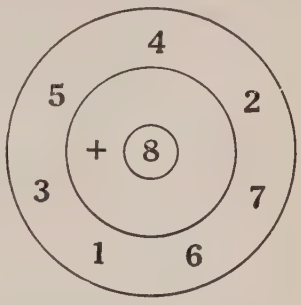
The teacher calls a number, as: 8. The children named go quickly to the board, and each picks out a combination that makes 8. One child is left without a card.

The next time, the teacher calls the same number of children as there are combinations. The child who failed last time takes his place in this group and thus has a second chance.

The Race-Track Addition

Number playing. Any number, one at a time.

Material. Chalk and string to draw circles on the blackboard.



Directions. See how fast the children can go around the track, adding the number at the center to the numbers on the track. Larger numbers may be used if desired, and more numbers may be placed around the track.

This game may be adapted to subtraction, multiplication, division, and fractions.

Silent Addition Drill

Number playing. Whole class, a row, or a group.

Material. A sheet of paper and pencil for each child.

Directions. Each child is assigned a number name by the teacher, as: 3, 7, 9, or 10. The leader calls two children by their real names, as: John and Mary. The children stand and state their number names. The children sitting write the answer only, and as the two pupils who are called upon are seated, they also write the answer.

At the close of the game, the teacher reads the answers and the pupils check their results.

This may be made more difficult by calling more names or giving larger numbers.

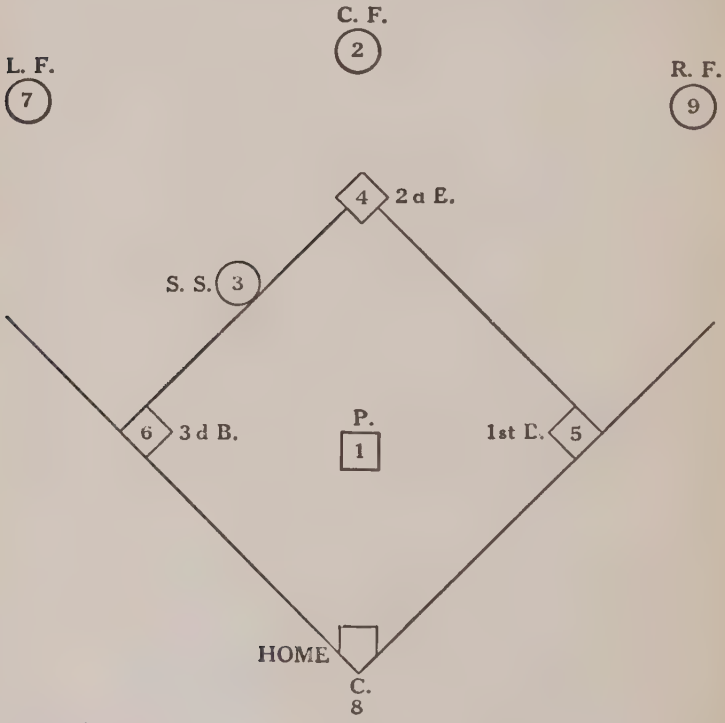
This may also be made a contest by rows or sides by seeing which row has the greatest number of children who have all results correct.

This game may be used for drill in multiplication.

Baseball

Number playing. Nine on each of two teams.

Directions. Draw an outline of a baseball diamond with numbers written on the bases and field positions. One side comes to bat. The first player begins by adding



a certain number (for example, 7) to each number on the field. If he goes around without missing, he makes a run. If he misses, he makes an out. When three outs are made, the other side comes to bat. The pupils at their seats keep a record of the outs and runs.

Fish Pond

Number playing. Class or group and a leader.

Material. Fish cut from cardboard with combinations written on them.

Directions. The leader holds the box of fish at the front of the room. One child at a time takes out a fish.

If he can give the correct answer, he keeps the fish. If not, he puts the fish back into the pond. The child who catches the greatest number of fish wins the game.

The combinations may be varied as desired.

Concrete problems may be presented in this way.

My Family

Number playing. Any number, one at a time, and a leader.

Directions. Leader: "I belong to the 8 family. There are two of us. Guess our names."

Pupil: "Are they 6 and 2?"

Leader: "No, they are not 6 and 2."

Pupil: "Are they 3 and 5?"

Leader: "Yes, they are 3 and 5."

This game may be used also for multiplication.

Number Family

Number playing. Two pupils at a time.

Material. At two places on the blackboard write the sum of combinations as many times as combinations and their reverses can be supplied. Be sure to use zeros.

In the illustration, the 8 family, all the combinations are to make 8.

8	8	8	8	8	8	8	8	8	8

Directions. Two children start at the word "go" and write all the addition combinations and their reverses that make 8, not repeating any of the combinations. The pupil who is the first to have all correct is the winner.

This game may be varied for any combination.

Speed Relay

Number playing. The class by rows or equal groups.

Material. A number of cards, with combinations written on each card.

7 + 6
9 + 7
4 + 3

8 + 9
6 + 8
3 + 8

Directions. With an equal number of players in each row, place upon the first desk of each row, face down, as many cards as there are players in each row.

At a given signal, the first player in each row takes the top card, goes quickly to the blackboard, and writes his combinations with the results of each combination.

He then passes back to his seat and lays the remaining cards on the desk behind him. The second and succeeding players in each row continue the game in the same way. If an error is made by any player in the row, the one following must correct it before he writes his own combinations. The row which first has all of its combinations correct wins.

This game may be used for addition, subtraction, multiplication, or division combinations.

It requires all players to watch the game closely.

Bean-Bag Combination Race

Number playing. Class by equal groups or rows.

Material. One set of cards with number combinations and one bean bag for each group or row.

Directions. A leader is chosen for each row. When all are ready, the first card is held up by each leader. The pupils in each row write the answer as quickly as possible. As soon as each one is through, he rises. When all in the row are standing, the first one passes the bean bag back over his head with both hands, then sits down, and each one in turn does the same. The last one runs to the front of the row with the bag as the children in the row all move back one seat.

A new card is then held up by the leader, and the game continues until all in a row have been to the front.

The leader writes on the board the correct answers for his row and the children mark their papers.

The row that finishes first, with all answers correct, wins.

Catch and Say

Number playing. Class or rows.

Material. Bean bag or ball.

Directions. The children form a circle with one child as leader inside the circle. As the leader tosses the bag or ball to some one in the circle, he says:

"Catch! Catch! Catch and say
Number 8 in another way."

The player to whom the bag or ball is tossed must toss it back to the leader after stating one of the combinations which makes 8, as:

"Six and 2, this I say,
Makes number 8 in another way."

The leader may be changed as often as advisable.

A player making a mistake takes his seat and writes the combinations for all numbers given.

Addition Relay Race

Number playing. Entire class.

Directions. Have the same number of children in each row.

The teacher places a number on the board opposite each row, as:

3 5 7 9

The teacher gives a number to be added, as 4 (usually the number selected for special drill).

At a given signal, each child in the front seat goes to the board and places under his number the sum of his number and 4, as:

7 9 11 13

He goes to his seat and hands the chalk to the next child in his row, who runs to the board and adds 4 to the last sum for his row, as:

11 13 15 17

Continue until each child in each row has had a turn.

Even if a child makes a mistake, the next child adds 4 to the last sum. In this way the speed is not interrupted and one cannot get his answer ahead of time.

The row that finishes first, with all sums correct, is the winning row.

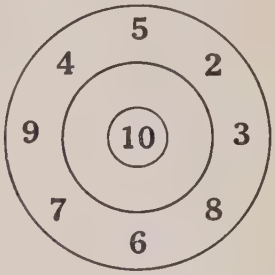
The mistakes can then be corrected.

The Race-Track Subtraction Drill

Number playing. Any number, one at a time.

Material. Crayon and a string to draw the race track on the board.

Directions. The numbers around the circle are to be subtracted from the one at the center. Each pupil in turn will state one difference.



Make the drill rapid. The game may be made a race.

The number at the center may be changed whenever desired.

This game may be used also as a drill in addition, multiplication, or division.

The circle may be made from heavy cardboard with an open center so that it may be hung on the blackboard and the numbers at the center written with chalk.

Missing-Number Drill

Number playing. Whole class by rows or groups and a leader.

Material. Small flash cards with either addition or subtraction combinations indicated.

Directions. Have children rise by rows. The leader flashes addition cards to each child in turn.

ADDITION

2	4	3	6	0	7	4	1
–	–	–	–	–	–	–	–
5	9	7	10	8	9	7	6

The leader then flashes subtraction cards.

SUBTRACTION

9	7	8	5	10	6	9	7
–	–	–	–	–	–	–	–
5	2	6	5	7	4	3	2

Later, mixed addition and subtraction cards are flashed.

MIXED

4	9	4	8	10	7	3	8
–	–	–	–	–	–	–	–
9	2	7	2	3	10	7	3

This device may be changed to suit the needs of the class.

It may be made a contest either by timing the rows or by having the children alternate.

Partners — Subtraction Drill

(For subtraction facts to 10)

Number playing. Ten. Remainder of the class watch.

Directions. Pass out cards numbered from 0 through 9. For example: One of the ten pupils rises and says: "I'm 7. Who's my partner?" The child holding 3 rises and says: "I'm your partner — 3 from 10 leaves 7."

This game may be used with larger numbers, also for addition, multiplication, and division.

Silent Subtraction Drill

Number playing. Whole class by equal groups or rows.

Material. A sheet of paper and a pencil for each child.

Directions. The children are divided evenly by rows or groups. To one group are given number names larger than to the other group.

The leader calls on a child from each group by his real name. The two children stand and give their number names. The children seated write the difference between the two numbers given. The two children who are called upon also write the difference as soon as they are seated.

At the close of the game the teacher reads the correct answers, and the children correct their results.

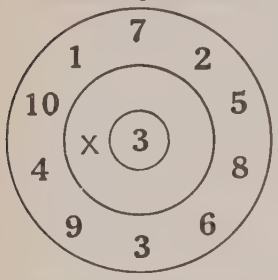
This may be made more difficult by using larger numbers.

It may be made a contest by counting correct results in each group.

This game may be used also for drill in addition, multiplication, and division.

Multiplication Drill

Number playing. Any number, one at a time.



Directions. Draw a race track on the board with numbers written around it. The numbers are to be multiplied by the number at the center.

Make the drill rapid.

This game may be made a race by timing each row.

The number at the center may be changed as often as desired.

Counting by 2s, 3s, 4s

Number playing. Three, unless repeated or supplemented.

Directions. One child pretends he is a bird and says: "I am a bird and I make 2 tracks on the ground." As he hops, he counts, "2, 4, 6, 8, 10," etc.

The second child pretends he is a rabbit and says, as he jumps: "I am a rabbit and make 3 tracks in the snow." He counts, "3, 6, 9, 12, 15," etc.

The third child pretends he is a toad. As he jumps, he says: "I am a toad and make 4 tracks in the sand." He counts, "4, 8, 12, 16, 20," etc.

Silent Multiplication Drill

Number playing. The class.

Material. Two pointers.

Directions. Draw the diagram on the blackboard. In the inner circle write the number of the table you wish

to use for drill; for example, 8. In the next circle write the figures from 1 to 12, in regular order. In the outer circle write the products of the table, not in regular order.

Divide the class into two equal groups and give the leader of each group a pointer. Choose one player from each side to keep the score on the blackboard. The two leaders with pointers stand near the diagram. The teacher points to 6 or some other number in the second circle, and each of the leaders tries to be the first to touch the product of 6 and 8—that is, 48.

The scorers give one score to the side whose player touches the correct product first.

If any player talks, his side forfeits a point.

The Store

Number playing. Class or group.

Material. Paper ribbon and pictures cut from magazines may represent the stock in the store. Paper discs may be used for money.

Directions. The customer: "How much is your ribbon?" The clerk: "Five cents a yard." The customer: "I should like 3 yards." The clerk measures the three yards and cuts it off, saying: "Three 5s are 15." The customer hands the clerk a quarter. The clerk returns the change, saying: "Fifteen and 10 are 25." The class solves each problem as the clerk announces the articles purchased and the price of each article.

Stagecoach

Number playing. Any number, one at a time.

Directions. For example: If the table is the 4s, the driver of the 4s stagecoach drives by 4s to 40, as: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40. The pupil is a good driver if he arrives at the end of the trip with all his passengers. He is a poor driver if he makes a mistake and the stagecoach breaks down. The numbers he misses represent the injured passengers.

One may be the driver of the 3s stagecoach, another may be the driver of the 5s stagecoach, etc.

Multiples and Factors

Number playing. The class or group.

Material. Two pointers.

Directions. Divide the class into two equal groups. Choose a player from each group to run a race, and give each of them a pointer. Choose an umpire and a scorer.

Write a list of multiples on the blackboard.

25	27	36	15	64	49	45
18	96	48	24	60	81	35
42	54	72	21	18	12	32

The teacher states the factors, and the first of the two players to touch the corresponding multiple with the pointer gets a score. For example: The teacher says: "Three sevens." The player who is first to point to 21 scores one point.

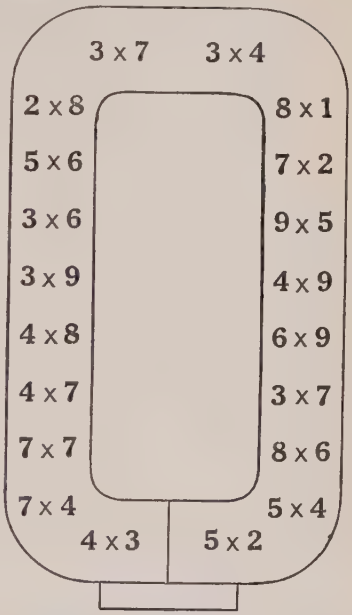
The scorer writes the score for that group.

When either player has made three scores, two other players are given a chance. The side having the largest score at the end of the game wins.

The Pony Track

Number playing. Any number, one at a time.

Directions. Allow each child to select the pony he wishes to ride, from the names of ponies written on the blackboard.



Draw a track on the board with multiplication combinations written on it. As many and as difficult combinations may be used as desired.

The pupil who gives the correct answers in the shortest time wins the race. Have the children see whose pony can go around the track the fastest. Make it a real race.

Suggested names of ponies: Prancer, Star, Racer, Prince, Black Beauty, Flash, Lightning.

The game may also be used for drill in addition, subtraction, and division.

Following the Leader

Number playing. The entire class.

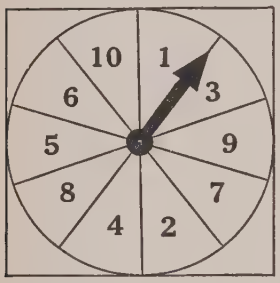
Directions. The pupils stand by rows. The teacher selects a number, as: 12.

Each pupil in succession must follow as the teacher dictates, as: Take 12, divide by 3, add 4, subtract 5, multiply by 6, take ½, etc.

The Multiplication Wheel

Number playing. The class.

Material. A cardboard or tagboard diagram as shown in the illustration, about 15 inches in diameter, with a freely swinging indicator.



Directions. Spin the indicator and multiply the number in the space at which it stops by the number selected for special drill. If you are teaching the 4s, multiply the number by 4.

This game may be modified to afford drill in addition, subtraction, and division, as may be needed.

Multiplying Down

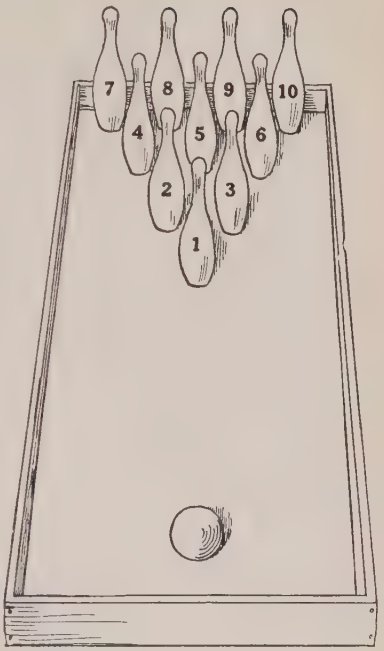
Number playing. The class.

Directions. Divide the class into two equal groups. Assign to the first child on either side one combination of a multiplication table. If he answers correctly, he keeps his place, and another combination is given to the first player on the opposite side, the same as in the old-fashioned "spelling down." If a mistake is made, the player making the mistake takes his seat, and the combination is given to his opponent.

The side having the greater number standing when the time is up wins the game.

Instead of giving the two factors of the table, the teacher may give the products and the children may give the factors.

Tenpins



Number playing. Two teams and a scorer.

Material. A set of small "tenpins" and a wooden ball about the size of a croquet ball.

Directions. Alternating sides, each child stands at a distance of 15 or 20 feet and rolls the ball to see how many pins he can knock down. Assign a different value to each pin according to the table you wish to drill. Multiply the number of pins knocked down by the number assigned. The scorer announces the number of pins knocked down, and the class keeps the score for both teams.

Combination Making

Number playing. The entire class.

Directions. The teacher places on the blackboard such numbers as 12, 18, and asks the children to see how many addition or multiplication combinations they can write that produce the given sum or product. For example:

$12 = 7+5$, $6+6$, etc.; or 3×4, 2×6, 1×12, etc.

Factors Game

Number playing. Two equal rows or teams.

Illustration. A horizontal row of baskets is drawn on the blackboard. On each basket is written a multiple.

Directions. The first player in each of two teams is given a piece of different colored chalk and starts at either end of the row of baskets at a given signal. The players place under the baskets all the combinations of that multiple, as:

2×9
3×6

The teacher or a pupil erases incorrect combinations, and either player may insert the correct ones. Each correct combination counts one point. The score of each side can then be determined.

The answers are erased.

The first player then gives his chalk to the next player of his team, and the race continues.

Basket Ball

Number playing. Any number, one child at a time, and a teller.

Material. Wastebasket, number of bean bags according to combination taught. Cubes, balls, erasers, etc., may be used instead of bean bags. For illustration, 6 will be used.

Directions. Place a wastebasket at the front of the room. A child stands at a given distance from the basket and attempts to throw the six bags, one at a time, into the basket.

Assign the same value to each bag according to the multiplication table selected for drill.

Keep score by multiplying the number of bags thrown into the basket by the value assigned to the bag.

Make the game into a contest.

The game may be varied by placing different values on each bag, as, 6, 5, 4, 3, 2, 1, and multiplying by 6 the number of the bag that is thrown into the basket. For example, if bags number 3 and 2 go into the basket, the score is 18+12, or 30.

Guessing Factors

Number playing. The class or a group.

Directions. The leader says, for example: "The product of two numbers is 24. Guess the numbers."

First child: "Are they 8 and 3?"

Leader: "No, they are not 8 and 3."

Second child: "Are they 24 and 1?"

Leader: "No, they are not 24 and 1."

Third child: "Are they 2 and 12?"

Leader: "Yes, they are 2 and 12."

This may be made as difficult as desired by using larger numbers.

Multiples

(Card drill)

Number playing. The class.

Material. Make cards like those on the opposite page. Write "3×1" on one side of the card and "1×3" on the other side of the same card. The twelve cards with answers have one side blank.

Directions. Give one card to each player. If the class has more than twenty-four pupils, make two sets of cards and use as many of the second set as are needed.

One child goes to the front of the room and shows his card to the class, as: "3×7." The player who has the card with "21" on it goes forward and stands beside the first player.

If the next player shows a card with only one number on it, as "30," the child who has the card "3×10" goes forward and shows his card. Pupils at their seats watch for mistakes.

This game may be used for any table.

Mixed Combinations

Number playing. The class.

Directions. Have the children form a circle. Arrange the flash cards or give orally such combinations as: 10−?=7; 7+?=13; 8−0=?; 6+?=10; 9÷3=?; 10−?=6; 11−7=?; 7+0=?; 7+5=?; etc.

A player who makes a mistake must go inside the circle. He may regain his place by correcting the one who fails.

Keep score on the blackboard, giving points each day to each player who has not had to go inside the circle. At the end of the week, see how many have a perfect score.

The cards described in the game "Multiples" on the preceding page are presented below:

Face	3 × 2	3 × 3	3 × 4	3 × 1
Back	2 × 3	3 × 3	4 × 3	1 × 3

Face	3 × 7	3 × 8	3 × 6	3 × 5
Back	7 × 3	8 × 3	6 × 3	5 × 3

Face	3 × 11	3 × 12	3 × 9	3 × 10
Back	11 × 3	12 × 3	9 × 3	10 × 3

Answers	3	6	9	12	15	18
	21	24	27	30	33	36

A similar set of cards may be made for each multiplication table as it is taught.

Foremen and Helpers

Number playing. Groups or rows.

PART I

Directions. The teacher assigns a number to each child. To one row or group are assigned multiples (foremen), as: 18, 20, 21, 24, 32, 36, 48, 72.

To the other group or row are assigned factors (helpers), as: 2, 3, 4, 5, 6, 7, 8, 9, 12, etc.

One foreman says, "I am 24. Where are my helpers?"

Each helper, as, 2, 12, 8, 3, 4, 6, rises and says, for example, "I am 2," "I am 12," etc.

PART II

Directions. After the helpers have all answered, the first helper says, "I am 2. Who is my buddy?" His buddy, 12, answers, "I am your buddy, $2 \times 12 = 24$."

The second helper says, "I am 3. Who is my buddy?" His buddy, 8, answers, "I am your buddy, $3 \times 8 = 24$."

Bouncing Ball

(Multiplication drill)

Number playing. The class by equal rows or equal groups.

Material. Large rubber ball.

Directions. The children form a circle, and a number is assigned to each—a multiple of the number of the table selected for drill. If the drill is to be on the table of 3s, number the children 3, 6, 9 12, 15, 18, 21, 24, 27, 30. Stand outside of the circle, give one step of a table, as 3×6, and toss the ball so that it will come down and bounce within the circle.

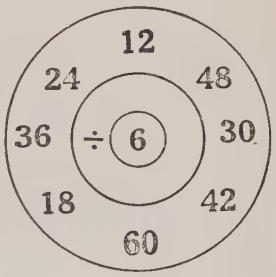
When the teacher states "3×6," the child whose number is 18 must catch the ball as it bounces, state the product, $3 \times 6 = 18$, and toss the ball back to the teacher. Only the child whose number is the product of the numbers given may touch the ball.

When a child fails to respond, or touches the ball out of turn, he must leave the circle. If he can later correct a mistake he may again take his place in the circle.

Race-Track Division Drill

Number playing. Any number, one at a time.

Directions. The numbers around the circle are to be divided by the one in the center. Each pupil has one turn. Make the game a rapid drill.



The game may be made more difficult by changing the numbers.

For a race, see how long it takes each row or each of two equal groups to go around the track.

Several sets may be made on cardboard rings and hung up on the blackboard.

A hole may be made in the center so that the number written on the board will show through.

Fraction Combination Race

Number playing. The class.

Directions. Divide the blackboard into a number of equal spaces and in each space write an example.

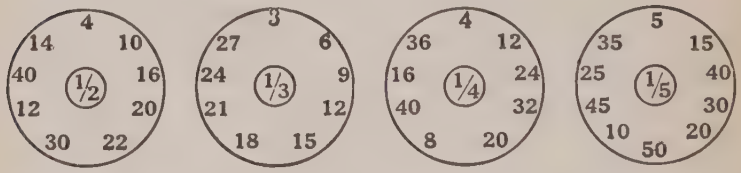
$\frac{1}{4}+\frac{1}{2}$ $\frac{1}{3}+\frac{1}{6}$ $\frac{1}{5}+\frac{1}{6}$ $\frac{2}{5}+\frac{3}{5}$

Separate the class into two equal groups and select a player from each side for a race. One player starts at the left and the other at the right. Each writes the answers as rapidly as possible in the space below the examples. The player who has written the greater number of correct answers when the players meet wins the race.

The teacher changes the examples, and two new racers then start. Continue the game until all players have had a chance. The score should be kept on the blackboard.

Catching Mice

Number playing. A group or row.



Directions. One pupil is selected for the cat. He points to the numbers around the circle. The remainder of the children are mice, and are caught by the cat if they fail to answer correctly. If a mouse gives a wrong answer, and the cat does not notice it, the cat must give up his place to the mouse who corrects it. The cat becomes a mouse and takes the place of the mouse which caught him.

The same diagram may be used for a drill in addition, subtraction, or multiplication.

Gun Club

Number playing. Two teams of 6 each.

Material. Soft rubber return-ball.

Directions. Draw on the blackboard a diagram as illustrated. At a convenient distance make a mark on the floor where each player must stand. Alternating sides, the players throw the ball at the diagram.

Multiply the number that is struck on the diagram by whatever number is selected. If 5 is selected, multiply the number struck by 5 for the score.

This game may also be used for addition.

Decades

Number playing. The class.

Material. Make twenty cards with five numbers on each card. Make the figures 8, 7, 12, 9, 14, large enough to be seen by a child in any part of the room.

Directions. Divide the class into two equal groups. Each group chooses ten members to represent it. The two teams stand at opposite sides of the room.

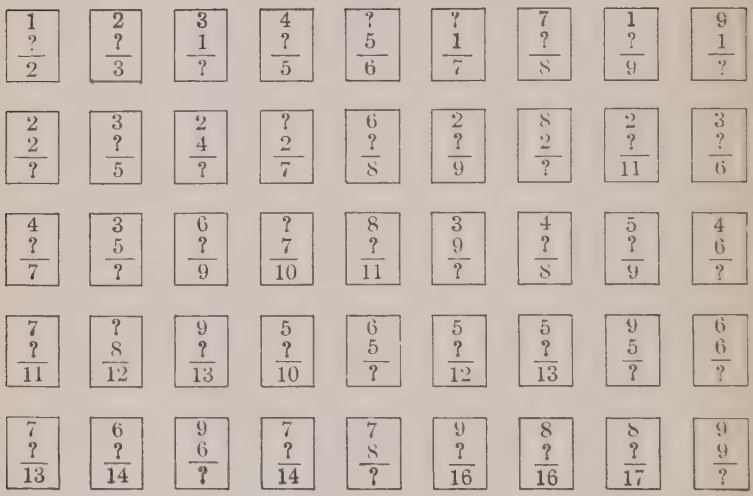
The teacher selects a number to be added to, or subtracted from, each number on the card which she displays. When the teacher shows a card, a player from one team answers, taking the number chosen and adding it to, or subtracting it from, each number on the card. Answers only should be given. Sides alternate in answering.

The score for each team should be kept on the blackboard.

Flash Sight Number Drill

Number playing. The class.

Material. Make cards as shown below.



Directions. Divide the class into two equal groups on opposite sides of the room, with the teacher in the front of the room. The teacher flashes a card.

The first child in one group must give the missing number. If he fails to tell the missing number, he must return to his seat and the opposite player must answer. If his reply is correct, he retains his place and the teacher flashes another card, calling for the missing number from a player on the opposite side.

A player may regain his place in the line by correcting an error before it is corrected by some one on either side.

The side having the greater number standing at the close of the game wins.

PART II. NUMBER RIMES

Rimes have always played an important part in the early entertainment and education of children. From the nursery through the early years of school life these beautiful lines of rime and rhythm have been taught. They seem to strike a responsive chord in the lives of children and are scarcely less potent in their influence when children have grown to manhood and womanhood, for *they* in turn teach them with delight to following generations.

It is to satisfy the number hunger of the younger children that the number rimes are here presented. They have been selected with care from the rimes which were taught to many of us in early childhood when they made their contribution to our pleasure and early training.

This Little Pig Went to Market

This little pig went to market,
This little pig stayed at home,
This little pig had roast beef,
This little pig had none,
This little pig cried, "Wee, wee, wee,"
All the way home.

The Day Is Done

1 One, one,
The day is done.

2 Two, two,
So falls the dew.

3 Three, three,
The moon I see.

4 Four, four,
I'll play no more.

One—Two—Three

1 2 3
One, two, three,
One, two, three,
I like cats,
And cats like me.

1 2 3
One, two, three,
One, two, three,
I like dogs,
And dogs like me.

One I Love

1 One I love,
2 Two I love,
3 Three I love, I say,
4 Four I love with all my heart,
5 And five I cast away.

One to Ten

1 2 3 4 5 6 7 8 9 10

One, two, three, four, five,
I caught a hare alive.

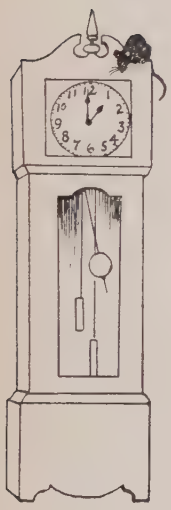
Six, seven, eight, nine, ten,
I let it go again.

Seven Little Daisies

7
−3
4

Seven little daisies
Peeping through the grass,
Katie picked off three of them,
How many did she pass?

Hickory, Dickory, Dock



Hickory, dickory, dock,
The mouse ran up the clock;
The clock struck *one*, 1
The mouse ran down,
Hickory, dickory, dock.

Hickory, dickory, dock,
Two mice ran up the clock;
The clock struck *two*, 2
Down both mice flew,
Hickory, dickory, dock.

Hickory, dickory, dock,
Three mice ran up the clock; 3
And then four more 4
Ran in at the door,
Hickory, dickory, dock. 7

Hickory, dickory, dock,
Four mice ran up the clock,
The clock struck eight, 8
Not one did wait,
Hickory, dickory, dock.

Hickory, dickory, dock,
Five mice ran up the clock; 5
And then six more 6
Crept in at the door,
How many mice in the clock? 11

Old Mother Hubbard

Old Mother Hubbard
Went to the cupboard,
To get her poor dog a bone;
But when she got there,
The cupboard was bare,
0 And so the poor dog had none.

One and Two and Nine

1 On a pretty lilac bush,
2 Are purple blossoms fine,
9 Can you count the bunches,
12 One and two and nine?

The Old Woman Who Lived in a Shoe

There was an old woman
Who lived in a shoe,
She had some little children,
Very much like you.

4 Four boys and six girls,
6 Now tell me true,
How many children
10 Were in the shoe?

Baa, Baa, Black Sheep

Baa, baa, black sheep,
Have you any wool?
Yes, sir, yes, sir,
Nine bags full.
3 Three for my master,
3 Three for my dame,
3 And three for the little boy,
— Who lives in our lane.
9

Change the number to 2 + 2 + 2, or
4 + 4 + 4, or
5 + 5 + 5

Many of the multiplication tables may be introduced by the use of rimes.

Three Wise Men of Gotham

3 Three wise men of Gotham
Went to sea in a bowl;
If the bowl had been stronger,
My story would have been longer.

Rub-a-Dub-Dub

Rub-a-dub-dub,
3 Three men in a tub,
The butcher, the baker,
The candlestick maker.

1 + 1 + 1 = 3

Ten Yellow Dandelions

Ten yellow dandelions,
2 Looking toward the sun;
3 How many are there when
1 I've picked
6 Two and three and one?

10
−6
—
4

Barber, Barber, Shave a Pig

Barber, barber, shave a pig;
6 How many hairs will make a wig?
20 Six and twenty, that's enough,
— Give the barber a pinch of snuff.
26

Sing a Song of Sixpence

Sing a song of sixpence,
A pocket full of rye,
4 Four and twenty blackbirds
20 Baked in a pie;

24 When the pie was opened,
The birds began to sing;
Wasn't that a dainty dish
To set before the king?

One, Two, Three, and Four Legs

Two legs sits upon three legs, (2) (man) (3) (stool)
With one leg in his lap; (1) (mutton)
In comes four legs (4) (dog)
And runs away with one leg;
Up jumps two legs,
Catches up three legs,
Throws it after four legs,
And makes him bring one leg back.

Ten Little Pennies

Ten little pennies,
How they did shine!
One went for candy,
And then there were nine. 10 — 1 = 9

Nine little pennies,
Waiting their fate,
One went for chewing gum,
And then there were eight. 9 — 1 = 8

Eight little pennies,
Three less than eleven,
One bought some marbles,
And then there were seven. 8 — 1 = 7

Seven little pennies,
All were in a fix,
One bought a cookie,
And then there were six. 7 — 1 = 6

Six little pennies,
Sure as you're alive,
One bought some pop corn,
And then there were five. 6 — 1 = 5

Five little pennies,
Not any more,
One bought a lollypop,
And then there were four. 5 — 1 = 4

Four little pennies,
All there were to see,
One bought a whistle,
And then there were three. 4 — 1 = 3

Three little pennies,
Only left, a few,
One went for peanuts,
And then there were two. 3 — 1 = 2

Two little pennies,
To finish up the fun,
One bought a picture card,
And then there was one. 2 — 1 = 1

One little penny,
When the day was done,
That bought an apple
And then there was none. 1 — 1 = 0

Ten little pennies,
Spent since early dawn,
Oh, what a foolish boy,
With all his money gone! 10 — 10 = 0

10 9 8 7 6 5 4 3 2 1

Twenty Little Chick-a-dees

Twenty little chick-a-dees, 20
In the bushes seen, − 2
Two flew away, ——
Then there were eighteen. 18

Eighteen little chick-a-dees, 18
Looking bright and keen, −2
Two flew away, ——
Then there were sixteen. 16

Sixteen little chick-a-dees, 16
Hopping on the green, −2
Two flew away, ——
Then there were fourteen. 14

Fourteen little chick-a-dees, 14
Working for themselves, −2
Two flew away, ——
Then there were twelve. 12

Twelve little chick-a-dees, 12
Had their breakfast then, −2
Two flew away, ——
Then there were ten. 10

Ten little chick-a-dees, 10
Sitting on the gate, −2
Two flew away, ——
Then there were eight. 8

Eight little chick-a-dees, 8
Doing funny tricks, −2
Two flew away, ——
Then there were six. 6

Six little chick-a-dees, 6
Sitting in the door, −2
Two flew away, ——
Then there were four. 4

Four little chick-a-dees, 4
Looking up at you, −2
Two flew away, ——
Then there were two. 2

Two little chick-a-dees, 2
Blinking in the sun, −2
Two flew away, ——
Then there was none. 0

The Ten o'Clock Scholar

A dillar, a dollar,
A ten o'clock scholar,
What makes you come so soon?
10 You used to come at ten o'clock,
But now you come at noon.

Four and Twenty Tailors

24 Four and twenty tailors
Went to kill a snail,
The bravest man among them
Dared not to touch her tail;
The snail put out her horns
Like a little Kyloe cow,
Run, tailors, run,
Or she'll kill you all e'en now.

Going to St. Ives

As I went to St. Ives,
I met seven wives;
Each wife had seven sacks,
Each sack had seven cats,
7 Each cat had seven kits,
Kits, cats, sacks, and wives,
How many came from St. Ives?

One for the Money

1 One for the money,
2 Two for the show,
3 Three to make ready,
4 And four to go.

Miscellaneous

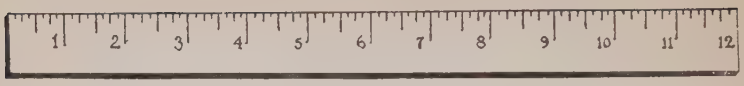
Dime

Nickel

Do you know, my little scholar,
10 There are ten dimes in a dollar,
20 Twenty nickels make the same,
Though they have a different name?

What's a score? 10
Ten and ten more. 10
20

Sixty seconds make a minute,
Sixty minutes make an hour,
If you've work to do, begin it,
Do it now, with all your power.



Twelve inches make a foot.
Of our table that's the root.
Three feet in every yard,
Let us measure, it's not hard.

A dozen is twelve, 12
Or four times three.
Half a dozen is six, 6
As plain as can be.

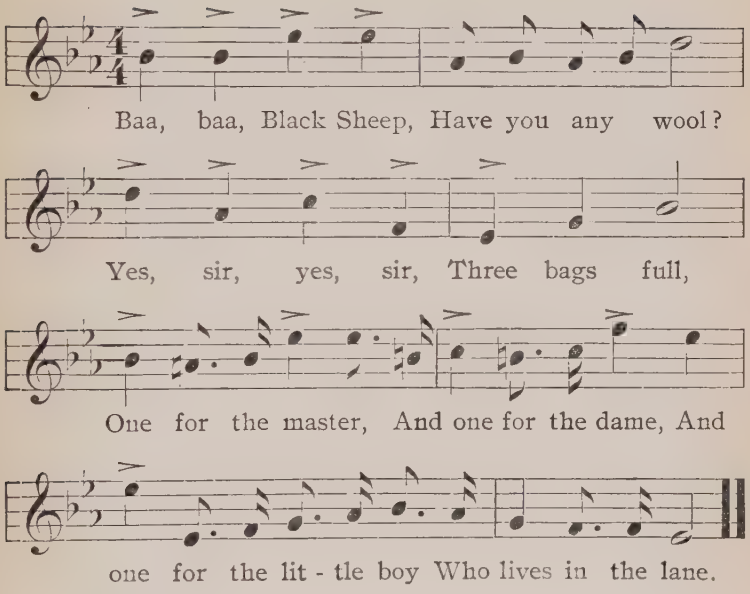
PART III. NUMBER SONGS

In the journey from the cradle to the grave, there is probably not an educative influence which has a more refining effect upon the race than has music. There is no influence which is earlier applied and more potently felt. It soothes in infancy, sweetens in childhood, stimulates the finer emotions in youth, refines and stabilizes throughout the years of manhood and womanhood, and satisfies and ennobles through the declining years.

Number songs are intended to contribute their part to character building in the early years of child life by combining the practical sense of numbers with the emotional appeal of music. These number songs have been compiled with the hope that they may be of use to those who have the care and education of children.

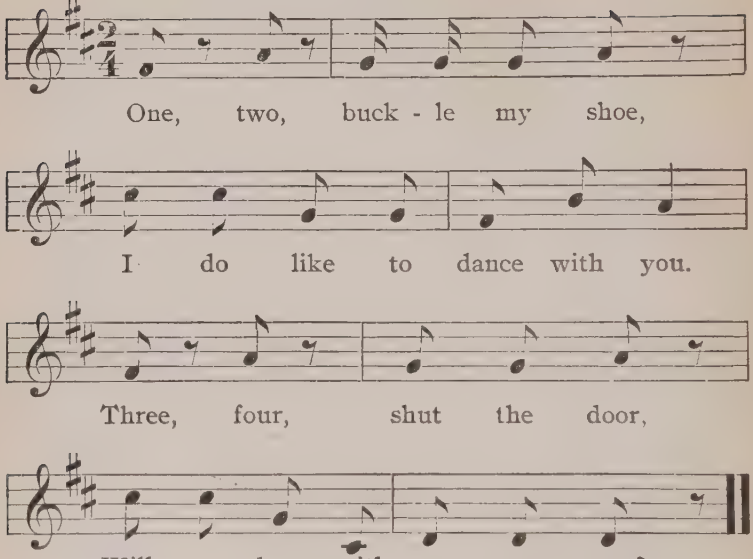
Baa, Baa, Black Sheep

(*Scheuerman*)


Baa, baa, Black Sheep, Have you any wool?
Yes, sir, yes, sir, Three bags full,
One for the master, And one for the dame, And
one for the lit - tle boy Who lives in the lane.

Baa, baa, Black Sheep,
Have you any wool?
Yes sir, yes sir,
Three bags full,
/ One for the master,
/ And one for the dame,
/ And one for the little boy
3 Who lives in the lane.

Mother Goose Schottish

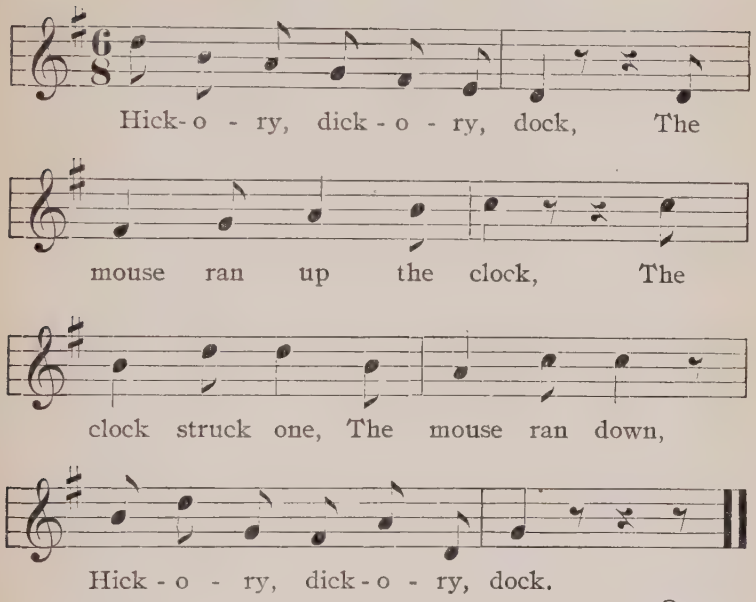


I
One, two, buckle my shoe, 1 2
I do like to dance with you.
Three, four, shut the door, 3 4
Will you dance with me once more?

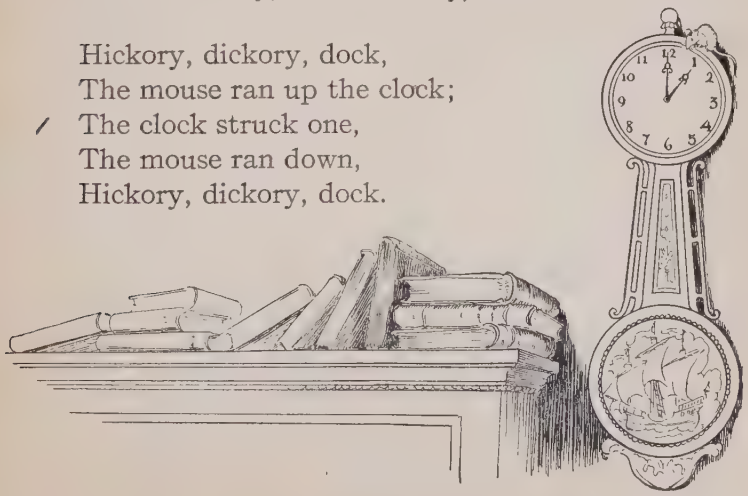
II
Five, six, pick up sticks, 5 6
Watch the fiddlers playing tricks.
Seven, eight, lay them straight, 7 8
For the time is growing late.

III
Nine, ten, says "Big Ben," 9 10
I can't dance with you again.
Eleven, twelve, let us delve, 11 12
Lest we're caught by little elves.

Hickory, Dickory, Dock

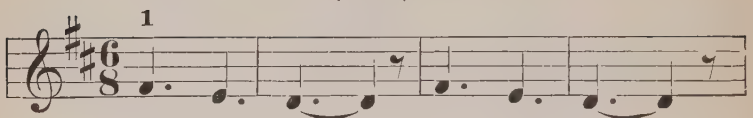


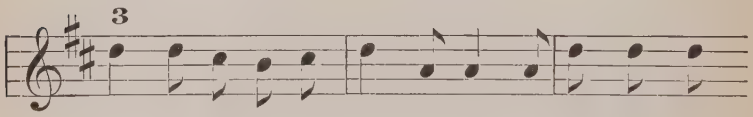
Hickory, dickory, dock,
The mouse ran up the clock;
The clock struck one,
The mouse ran down,
Hickory, dickory, dock.

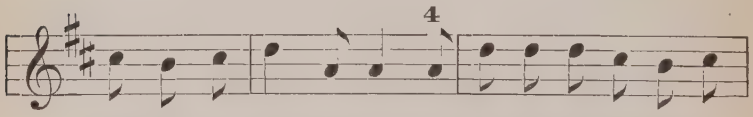


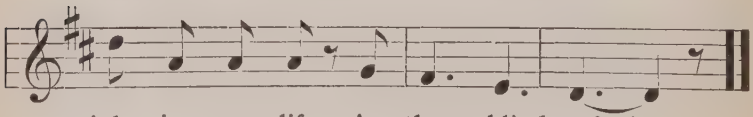
Three Blind Mice

(*Round*)



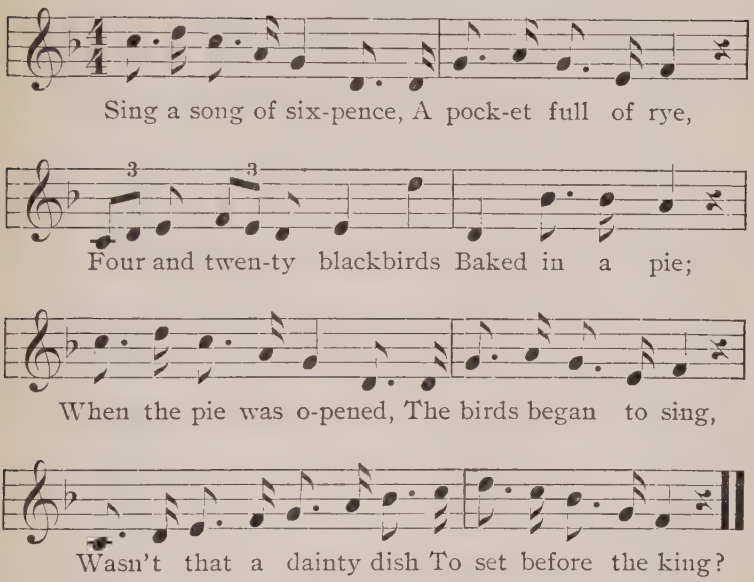






Three blind mice! Three blind mice!
See how they run! See how they run!
They all ran after the farmer's wife,
She cut off their tails with a carving knife,
Did you ever see such a sight in your life
As three blind mice?

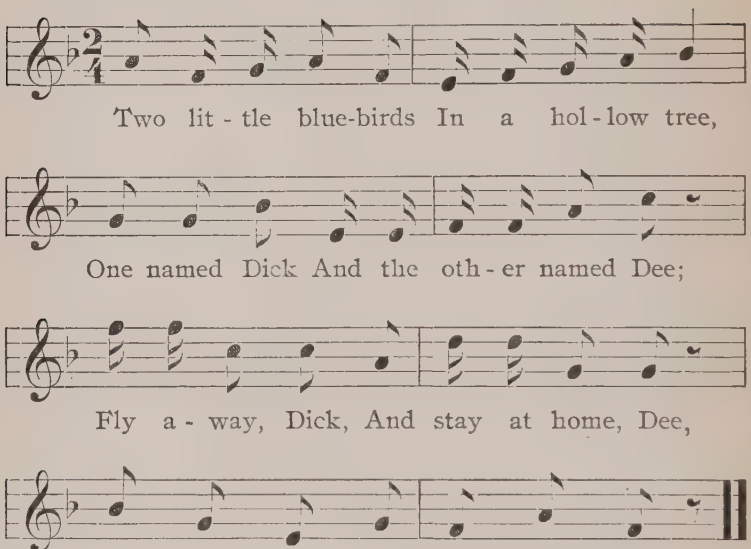
Sing a Song of Sixpence


Sing a song of six-pence, A pock-et full of rye,
Four and twen-ty blackbirds Baked in a pie;
When the pie was o-pened, The birds began to sing,
Wasn't that a dainty dish To set before the king?

Sing a song of sixpence,
4 A pocket full of rye;
20 Four and twenty blackbirds
24 Baked in a pie!
When the pie was opened,
The birds began to sing;
Wasn't that a dainty dish
To set before the king?

Two Little Bluebirds

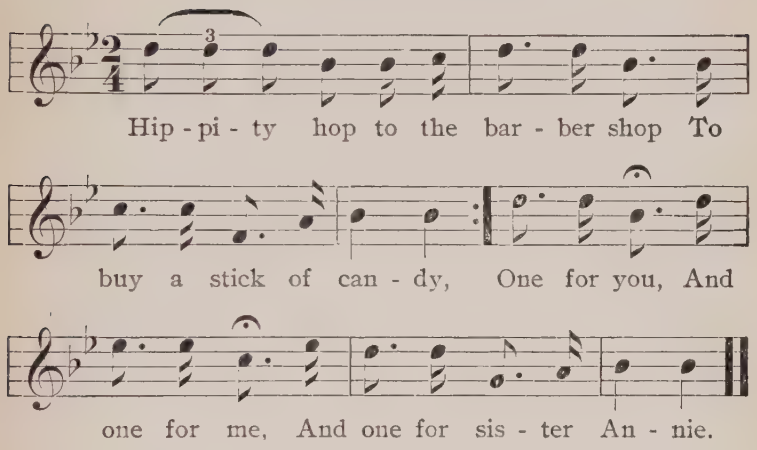
(*Scheuerman*)


Two lit - tle blue-birds In a hol - low tree,
One named Dick And the oth - er named Dee;
Fly a - way, Dick, And stay at home, Dee,
Come back, Dick, to bird - ies three.

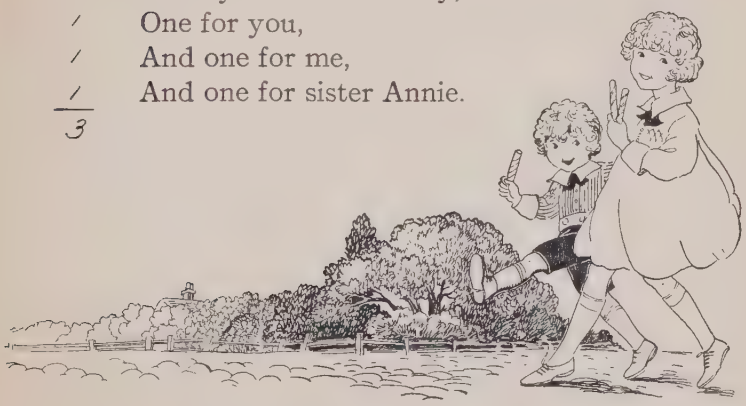
2 Two little bluebirds
In a hollow tree,
One named Dick
And the other Dee,
Fly away, Dick,
And stay at home, Dee,
Come back, Dick, to birdies three.

Hippity Hop to the Barber Shop

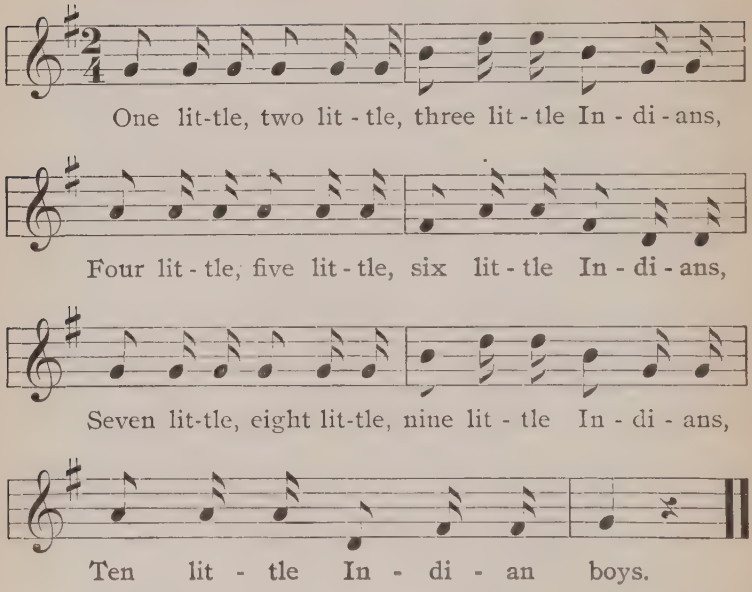
(*Scheuerman*)



Hippity hop to the barber shop
To buy a stick of candy,
One for you,
And one for me,
And one for sister Annie.



Ten Little Indians


One lit-tle, two lit - tle, three lit - tle In - di - ans,
Four lit - tle, five lit - tle, six lit - tle In - di - ans,
Seven lit-tle, eight lit-tle, nine lit - tle In - di - ans,
Ten lit - tle In - di - an boys.

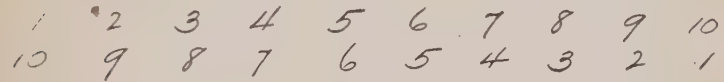
Directions. Ten children form a large circle and are numbered from 1 to 10. As each child's number is sung, he steps into an inner circle and joins the Indian dance around the circle.

One little, two little, three little Indians,
Four little, five little, six little Indians,
Seven little, eight little, nine little Indians,
Ten little Indian boys.

As the reverse is sung, the children return to their places, one at a time, as their numbers are sung.

Ten little, nine little, eight little Indians,
Seven little, six little, five little Indians,
Four little, three little, two little Indians,
One little Indian boy.

This may be varied by having the children remain in their seats and ten children rise, one at a time, as the song is sung, and be seated, one at a time, beginning with ten, as the reverse is sung.



Ten Little Fingers

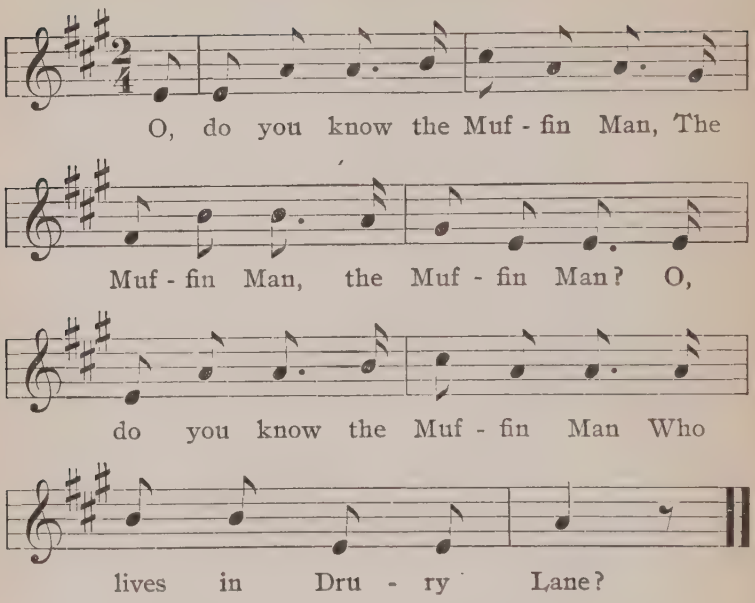
(Sung to the tune of "Ten Little Indians")

One little, two little, three little fingers,
Four little, five little, six little fingers,
Seven little, eight little, nine little fingers,
Ten little fingers clean.

Ten little, nine little, eight little fingers,
Seven little, six little, five little fingers,
Four little, three little, two little fingers,
One little finger clean.

Children may hold up figures as the numbers are called.

The Muffin Man



Directions. Any even number of children form a circle. The teacher asks one child to start by stepping into the circle and choosing a partner. He faces his partner and makes a bow. The children sing:

O, do you know the Muffin Man,
The Muffin Man, the Muffin Man?
O, do you know the Muffin Man
Who lives in Drury Lane?

The partner answers:

Yes, I do know the Muffin Man,
The Muffin Man, the Muffin Man.
Yes, I do know the Muffin Man
Who lives in Drury Lane.

The two children skip around inside the circle as the other children sing:

2 O, two do know the Muffin Man,
The Muffin Man, the Muffin Man.
O, two do know the Muffin Man,
Who lives in Drury Lane.

Those two children face two other children and sing:

O, do you know the Muffin Man,
etc.

These partners answer:

Yes, we do know the Muffin Man,
etc.

The four children skip around as children sing:

4 O, four do know the Muffin Man,
etc.

This continues until all children are playing.

Two Soldier Boys Go Marching By

(Sung to the music of "The Muffin Man")

Directions. Children form a circle. Two children are chosen to start the game. These two children skip around inside the circle while all children skip and sing the following:

2 Two soldier boys go marching by,
Go marching by, go marching by,
Two soldier boys go marching by
To fight for Uncle Sam.

Each of the two children chooses another child. They skip around inside the circle singing the following:

4 Two soldier boys find two more boys,
Find two more boys, find two more boys,
Two soldier boys find two more boys
To fight for Uncle Sam.

All children skip, singing the following:

4 Four soldier boys go marching by,
Go marching by, go marching by,
Four soldier boys go marching by
To fight for Uncle Sam.

Each of the last two children chooses a partner as they skip around inside the circle singing the following:

6 Four soldier boys find two more boys,
Find two more boys, find two more boys,
Four soldier boys find two more boys
To fight for Uncle Sam.

All children skip, singing the following:

6 Six soldier boys go marching by,
Go marching by, go marching by,
Six soldier boys go marching by
To fight for Uncle Sam.

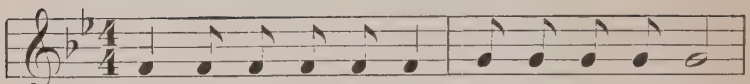
Each of the last two children chooses a partner as they skip around inside the circle singing the following:

8 Six soldier boys find two more boys,
Find two more boys, find two more boys,
Six soldier boys find two more boys
To fight for Uncle Sam.

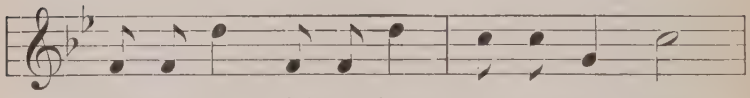
All children skip, singing the following:

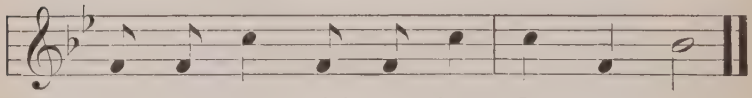
8 Eight soldier boys go marching by,
Go marching by, go marching by,
Eight soldier boys go marching by
To fight for Uncle Sam.

Chick-a-dee Song



CHORUS





10
−1
9

Ten little chick-a-dees sitting on a line,
One flew away and then there were nine.

Chorus

Chick-a-dee, chick-a-dee, happy and gay,
Chick-a-dee, chick-a-dee, fly away.

9
−1
8

Nine little chick-a-dees on the farmer's gate,
One flew away and then there were eight.

Chorus

8 Eight little chick-a-dees looking up toward heaven,
−1 One flew away and then there were seven.
7

Chorus

7 Seven little chick-a-dees gathering up sticks,
−1 One flew away and then there were six.
6

Chorus

6 Six little chick-a-dees learning how to dive,
−1 One flew away and then there were five.
5

Chorus

5 Five little chick-a-dees sitting at the door,
−1 One flew away and then there were four.
4

Chorus

4 Four little chick-a-dees could not agree,
−1 One flew away and then there were three.
3

Chorus

3 Three little chick-a-dees looking at you,
−1 One flew away and then there were two.
2

Chorus

2 Two little chick-a-dees sitting in the sun,
−1 One flew away and then there was one.
1

Chorus

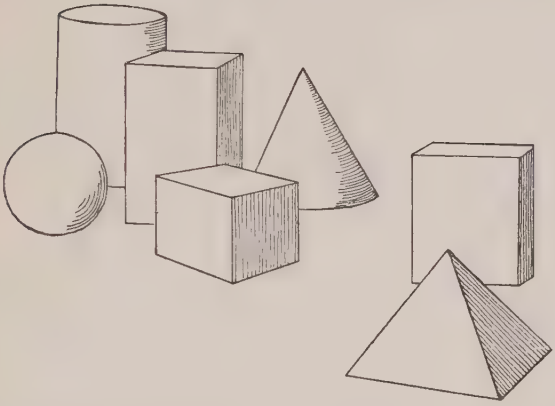
1 One little chick-a-dee living all alone,
−1 He flew away and then there was none.
0

Chorus

PART IV. SENSE-TRAINING EXERCISES

The study of numbers should be preceded and accompanied by carefully directed sense-training exercises. The purpose of these exercises is to create interest, cultivate observation, and to broaden the child's knowledge of some of the common things about him. A few easy sense-training exercises are suggested in the following pages. They have been presented, not as a complete list of sense-training material, but merely as suggestive of the type of exercises which may be used. The imaginative, alert teacher will think of many exercises which may be used to supplement the suggestions here presented. It is with this hope and expectation that the authors pass these suggestions on to you.

The Common Type Solids



The teacher will draw on the blackboard illustrations of the cube, sphere, square prism, oblong prism, cylinder, cone, and a square pyramid.

The type solids are valuable in sense training and comparisons. The names of the type solids should be taught incidentally. The teacher should call the solids by name as she uses them, until the pupils are familiar with them and know these solids by name.

"Look carefully at this cube I have in my hand. Who will find another cube just the size of this one? Who will find a smaller cube than this one?

"Let us see how many edges the cube has. We will count them together. Let us look carefully at all of the faces of the cube. Let us see if all of the cubes have the same number of faces and edges. Do all of the edges appear to be of the same length?

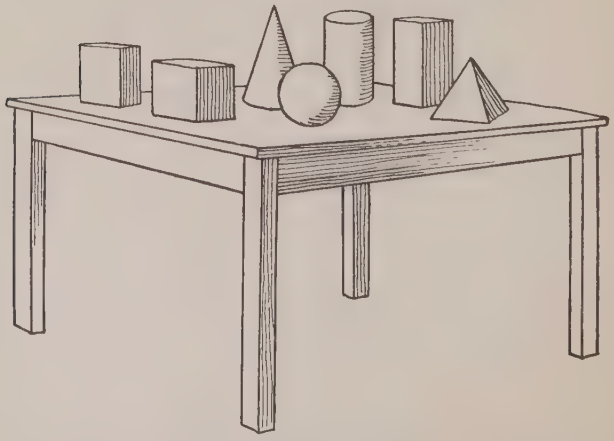
"Look about the room to see if you can find anything which looks like a cube. Do you remember anything at home which looks like a cube? Look for something on your way from school that appears like a cube. What is the largest cube you have ever seen?"

Use the same plan with the sphere, square prism, oblong prism, cylinder, and square pyramid until the pupils are familiar with them.

After the form and name of the various type solids are fixed in mind, ask the pupils to notice objects in the school building and outside to see how many objects are shaped like the various solids they have studied. Have pupils make lists of the solids as they find them.

One day emphasize cubes, another day cylinders, another day cones, etc.

Game to Teach Type Solids



Have all the type solids on a table in front of the class.

Send the pupil who is to ask the question out of the room while the children select one solid.

The questioner returns. Questioner: "Is it a cylinder?" (Holding up a cylinder.) Pupil: "No, it is not a cylinder." Questioner: "Is it a cube?" (Holding up a cube.) Pupil: "No, it is not a cube." Questioner: "Is it a sphere?" (Holding up a sphere.) Pupil: "Yes, it is a sphere."

Telephone

The teacher makes cards upon which are large figures in a row, as: 4709. She flashes the cards before the class. Calling on some child, she says, "Number, please." The pupil stands with one hand near his mouth and the other at his ear, as if telephoning, and reports from memory the numbers in the correct order, 4–7–0–9.

If the answer is correct, the teacher may say, "The line is busy," or, "Your party does not answer."

If the answer is incorrect, the teacher says, "Please look again for your number."

The children who miss should be given more drill.

Number Recognition

Material. Pasteboard cards each mounted with a large number cut from a calendar.

Directions. Place the cards on the chalk tray in correct order: 1, 2, 3, 4, 5, 6, 7, 8, 9. Children close their eyes. Teacher changes order of cards. At signal, children open their eyes. A child is called to rearrange the cards in order.

Form and Color

The various forms illustrated on page 103 should be cut from colored construction paper and mounted on cardboard about 6 by 9 inches. Use them first to teach the names, forms, and colors. Afterward use them as sense-training exercises.

There are six cards in the set with three forms on each card. As the cards are flashed, the child called upon will name the objects in order.

The Sense of Hearing

Counting by sound. The teacher says, "Children, sleep." She taps with a ruler 3 times, then 5 times, and says, "Children, wake." She calls upon a child, who says, "3 and 5 are 8."

Small numbers may be used at first, and then larger numbers.

Musical tones may be used instead of taps.

Answers may be written instead of oral.

This may also be used for multiplication and division.

Ear training. Blindfold one pupil. Allow another pupil to come forward and do some act, as, to tap on the desk three times. The blindfolded pupil says, "Who tapped on the desk three times?" The other pupil replies, "It was I." The blindfolded pupil says, "Was it you, Helen?" Helen answers, "Yes, it was I."

Helen is then blindfolded, and the game is continued.

This exercise permits of great variation.

Adding by sound. The teacher says, "I am thinking of 9." She claps her hands five times. The child answering claps his hands four times and says, "5 and 4 are 9."

1. CIRCLE Blue
SQUARE Yellow
TRIANGLE Red

2. SQUARE Red
TRIANGLE Blue
CIRCLE Yellow

3. TRIANGLE Yellow
CIRCLE Red
SQUARE Blue

4. CIRCLE Blue
TRIANGLE Red
SQUARE Yellow

5. SQUARE Red
CIRCLE Yellow
TRIANGLE Blue

6. TRIANGLE Yellow
SQUARE Blue
CIRCLE Red

The Sense of Touch

Counting. The teacher touches the hand of a child a certain number of times. The child counts to himself and states the number.

Addition. The teacher touches the child's hand 3 times and then 4 times. The child says, "3 and 4 are 7."

Subtraction. The teacher touches the child's hand 5 times and says "less" and touches it 2 times. The child says, "5 less 2 are 3."

This game may also be used as a drill in multiplication and division.

Endless chain. Ask a pupil to come before the class and touch three objects. Ask another pupil to repeat what the first pupil has done, naming the objects, as, book, pen, ruler, and adding another object, as, chair. Require each succeeding child to touch the objects in order, naming them, and adding a new object to the list.

Blind counting. A group of children stand before the class with hands behind them. The teacher places marbles in each child's hands. The teacher asks, "How many marbles have you, John?" John says, "I think I have five marbles." Showing the marbles, he says, "I have five marbles."

Blind reading of numbers. Cut, from sandpaper, figures about 2 inches high. Paste each figure on a cardboard. Children place their hands behind them, and the teacher distributes cards. By the sense of touch each child determines what figure he has on his card.

Touch sense training. Five or more pupils stand in front of the class, face the front, and hold their hands behind them. The teacher places a different-shaped

object in the hands of each child. The teacher asks, "Tom, what have you?" Tom replies, "I think I have a cube," and looking at the block he says, "I have a cube."

The Caller

Number playing. The class.

Directions. One child is sent from the room, and a number is assigned to each of the remaining children. The pupils in their seats listen while the child who has been sent from the room knocks on the door.

Suppose the pupil knocks on the door three times. The teacher says: "Whom do you seek?" Number three should promptly reply: "I am number three. I am wanted." Number three changes places with the caller by taking his place in the hall. Should number three fail to recognize his call, the one outside raps again.

Blind Man

Number playing. The entire class or group.

Directions. Children form a circle, and a number is assigned to each. One is blindfolded and stands within the circle. The children join hands and circle around the one blindfolded. When he taps his cane they stop, and he points his cane in any direction he chooses. The one toward whom the cane points takes hold of it. The blindfolded man asks: "Who takes hold of my cane?" The pupil replies: "It is I, number 8" (stating his number). The blindfolded man says: "It is John," and adds to 8 the number selected for special drill, 9, and says: "8 and 9 are 17." If his answer is correct, John is blindfolded and takes his place in the circle.

Sense Test

Number playing. The entire class.

Material. Any material in the schoolroom.

Directions. A pupil is selected who taps some object, as the globe, and says: "I tapped the globe three times."

The next child does the same as the preceding child and adds another act, as: "I tapped the globe three times, and I hopped twice."

The third does the same and adds some act of his own choice, as: "I tapped the globe three times, I hopped twice, and I walked three steps." Continue this game until it becomes so difficult that no pupil can remember the acts in order.

This exercise permits of great variation and originality with great possibilities in developing attention and concentration.

PART V. SPEED AND ACCURACY TESTS

The speed and accuracy tests included in *Number Helps* have been carefully prepared and have been tested as to the time in which they should be completed.

It has been found that the time for completion of the tests varies greatly according to the grade and ability of the children. It is well to establish a standard for each grade and attempt to have the largest possible number of the pupils attain the grade standard. If used systematically the tests will be valuable in checking progress in number teaching.

Selected tests should be given early in the term to determine individual proficiency. The same tests should be repeated at least twice during the term to check progress. The tests should be mimeographed so that they may be more easily used.

In giving the tests bear in mind that accuracy is more important than speed, but that both are very important. Drill for both speed and accuracy, but do not overemphasize speed to the point that it decreases accuracy.

Exercise 1

Can you write the sums of the following in less than 3 minutes?

3	3	4	2	1	2	4	7	5
8	7	9	3	3	9	4	7	6
2	6	2	4	5	1	2	5	1
8	7	2	8	9	4	6	5	7
3	2	8	3	2	1	4	3	9
9	5	8	5	7	8	5	3	9
1	6	3	1	6	5	7	1	7
1	9	4	5	6	8	8	9	9
4	5	3	6	8	1	2	1	4
6	7	6	8	9	2	4	6	7

Exercise 2

Can you write the sums of the following in one minute?

9	7	7	6	9	9	8	3
4	3	9	5	1	9	9	8
7	5	5	8	8	6	8	9
7	8	9	7	5	7	0	5
3	8	8	7	6	7	7	6
9	6	4	5	4	8	4	9

Exercise 3

Can you write the sums of the following in less than 5 minutes?

6	1	4	4	7	1	4	5
1	5	2	1	2	1	6	0
7	7	9	5	6	8	6	7
0	2	5	8	4	3	5	2
2	6	2	2	5	6	3	1
8	9	8	8	5	8	9	9
3	3	4	5	2	6	7	3
7	8	2	3	6	2	0	4
3	3	8	6	9	9	8	5
8	7	6	3	7	8	3	4
2	1	2	1	2	4	2	5
5	5	4	9	6	1	7	7
2	6	4	8	6	9	5	3
4	7	1	3	3	4	1	6
9	0	3	2	4	1	8	4
2	1	4	9	4	3	4	7
7	5	1	2	5	1	0	2
3	8	3	6	3	7	6	3

Exercise 4

Use these examples in subtraction for frequent drill. Keep a record of the time it takes you to write the correct results and try to improve your record. Some days take the examples by rows, some days by columns. How many of the examples can you finish in 4 minutes?

	a	*b*	*c*	*d*	*e*	*f*	*g*
	9	11	9	8	9	9	8
1.	4	2	7	4	3	6	6
	7	10	8	6	11	6	15
2.	2	5	2	3	3	2	7
	18	13	14	16	13	15	16
3.	9	6	8	9	9	8	7
	11	13	8	13	7	11	10
4.	5	8	5	4	5	9	7
	16	14	19	7	8	11	14
5.	8	5	7	4	3	7	9
	9	12	11	12	10	11	12
6.	5	8	4	9	8	6	5
	12	11	17	13	15	12	12
7.	4	8	9	5	6	3	6
	12	14	15	10	14	13	17
8.	7	6	9	6	7	7	8

Exercise 5

Write the correct results for as many of these examples in addition as you can in 5 minutes. Do the exercise several times on different days and try to improve your record.

	a	*b*	*c*	*d*	*e*	*f*
	65	72	43	82	74	43
1.	8	9	8	8	6	5
	75	12	19	46	78	64
2.	9	8	7	3	6	9
	15	72	49	74	36	91
3.	8	8	6	8	5	2
	38	43	81	24	13	85
4.	5	7	9	8	7	9
	33	43	92	18	11	89
5.	3	9	7	4	1	7
	49	74	52	43	78	91
6.	7	9	6	8	5	4
	43	84	14	17	19	42
7.	2	6	9	3	7	6
	35	53	49	57	66	59
8.	5	8	3	9	6	7

Exercise 6

Finish as many of these examples as you can in 10 minutes:

	a	*b*	*c*	*d*	*e*
	427	704	167	950	365
	384	387	978	347	473
1.	206	296	203	276	297
	391	942	586	891	408
	927	567	234	372	946
	346	328	987	694	875
2.	738	431	345	835	309
	265	609	602	278	438
	709	823	322	206	732
	280	479	910	735	856
3.	695	296	687	427	214
	448	584	905	969	932
	642	714	303	284	123
	973	622	459	319	987
4.	604	819	678	786	456
	298	745	192	456	604
	183	308	113	742	592
	745	275	879	105	376
5.	621	631	519	956	431
	487	289	698	387	586

Exercise 7

Write the products of the following in less than 5 minutes:

5	2	4	3	6
5	3	6	4	9
2	8	2	5	8
8	0	6	6	5
2	5	9	4	9
9	8	5	9	7
3	4	0	4	7
9	4	5	5	9
8	1	9	5	3
8	7	9	7	3
8	2	5	0	3
6	7	2	7	7
9	1	4	8	5
6	0	7	4	9
6	6	6	7	7
0	3	6	6	7
8	8	4	8	3
1	7	0	9	5

Exercise 8

How many of these examples in multiplication can you work in 10 minutes?

	a	*b*	*c*	*d*	*e*
1.	347 × 5	736 × 7	804 × 6	572 × 7	453 × 4
2.	328 × 6	342 × 8	790 × 5	905 × 9	738 × 6
3.	463 × 7	752 × 8	903 × 9	748 × 2	840 × 8
4.	608 × 5	375 × 3	296 × 6	408 × 9	392 × 7
5.	2)468	5)745	3)903	6)786	4)728
6.	7)987	9)396	8)760	7)378	6)234
7.	6)834	5)970	4)392	8)608	7)385
8.	9)846	7)637	8)752	3)927	5)980
9.	6)324	9)873	5)205	7)399	3)285

Exercise 9

Write the products for as many of these examples as you can in 10 minutes.

	a	*b*	*c*	*d*
	7430	9208	7006	3724
1.	6	4	8	5
	9273	8076	4732	1794
2.	9	5	3	7
	4308	7064	7977	3408
3.	9	7	6	8
	9208	4276	8437	6029
4.	3	2	8	6
	3876	3247	2009	4001
5.	4	2	5	9
	2976	4309	7825	6364
6.	6	5	3	4
	4284	9683	3245	8097
7.	2	7	6	5
	2691	7180	8248	2086
8.	8	9	3	7

Exercise 10

Try to finish these examples in subtraction in 6 minutes.

	a	*b*	*c*	*d*
	4837	7506	3708	7068
1.	2392	4875	2489	5249
	3006	4993	5408	6400
2.	2788	1629	2379	5298
	9240	7094	9607	1535
3.	3786	2308	4238	1268
	5204	7420	5304	8740
4.	3496	5647	2738	2974
	3004	8263	9040	7000
5.	2345	4783	8653	4378
	3872	3941	3000	5000
6.	2981	3873	2194	2873
	9876	8657	7526	9407
7.	3482	4298	5873	3596
	8746	4283	3240	3949
8.	2975	1697	2802	1786

Exercise 11

Get the correct results for as many of these examples as possible in 4 minutes.

a) Add:

	a	*b*	*c*	*d*	*e*
	9	7	4	8	6
1.	7	5	9	7	8
	—	—	—	—	—
	9	8	5	7	9
2.	5	9	7	9	6
	—	—	—	—	—

b) Subtract:

	12	17	17	8	13
3.	8	9	8	8	7
	—	—	—	—	—
	13	11	12	16	6
4.	8	7	9	7	9
	—	—	—	—	—

c) Add:

	24	38	73	87	74
	37	42	90	92	90
5.	20	76	48	48	78
	69	48	63	69	65
	—	—	—	—	—
	95	86	92	81	32
	70	72	87	40	91
6.	38	43	36	76	78
	67	95	74	39	26
	—	—	—	—	—

Exercise 12

Get the correct results for as many of these examples as possible in 10 minutes.

a) Subtract:

	a	*b*	*c*	*d*
	473	703	690	500
1.	298	547	387	274
	1037	728	803	948
2.	928	649	716	784
	3796	2091	8022	6841
3.	287	976	1573	972
	6505	7004	6214	6020
4.	1409	3729	3978	4987

b) Add:

	3842	9064	7805	2084
	7608	7398	4697	3907
5.	5471	4693	2568	9898
	2380	7087	3759	7904
	3719	8190	2550	9208
	7698	7285	3869	3976
6.	4873	4563	8768	7854
	2989	2418	4106	2785

Exercise 13

Get the correct results for as many of these examples as possible in 2 minutes.

a) Multiply:

	a	*b*	*c*	*d*	*e*
	7	9	8	0	8
1.	9	5	7	6	0
	9	7	6	8	0
2.	6	5	7	9	4

b) Divide:

	a	*b*	*c*	*d*
3.	6)54	7)49	8)56	9)63
4.	9)9	4)28	9)54	5)5

Exercise 14

Get the correct results for as many of these examples as possible in 7 minutes.

a) Multiply:

	a	*b*	*c*	*d*	*e*
	4830	3086	3786	4007	3987
1.	7	5	9	3	8
	8425	3874	4709	3825	9264
2.	26	53	68	47	95

b) Divide:

3.	4)7864	5)8740	9)27927	8)41960	5)3860
4.	3)7626	7)8904	2)3840	6)56390	4)9384

PART VI. SUGGESTIONS FOR THE USE OF "NUMBER HELPS"

INTRODUCTION

In most schools no definite allotment of time is made for number work until the second school year. In many schools the formal study of numbers is postponed until the beginning of the third school year. The purpose of *Number Helps* is, first, to lay a natural and easy foundation for the beginning of formal number study whenever it is taken up and, second, to stimulate interest in the study of arithmetic in all of the lower grades. Many of the games presented in *Number Helps* may be adapted even for the fifth grade.

Number work in the kindergarten and first grade should be limited to the number facts which children can acquire naturally through their games, play, and school activities. Children should not be asked to count more than ten to begin with, and for some of the children the objective should be five. Have the pupils count objects in the room, such as the children, the windows, the chairs, desks, books, children's fingers, hands, feet, and eyes. These simple counting exercises can be introduced in the form of games, rimes, and songs:

Number Games, Part I
Number Rimes, Part II
Number Songs, Part III

When teaching counting it is well to proceed in the following way: The teacher should require all children to listen while she counts certain objects. Then she asks all the children to count the objects with her. When she

is sure that all can count together, she may ask: "Who would like to count alone?" Others listen while several children in turn count alone.

In schools where numbers are not taught until the second grade, the counting and simple number games may be used in the kindergarten and first grade.

The following outline for the use of *Number Helps* will be found helpful.

THE KINDERGARTEN AND FIRST GRADE

I. Counting Through 100

Counting from 0 to 10:

A. Count the children in each row, the seats in each row lengthwise of the room, across the room, books on the desks, marbles, blocks, windows, pencils, fingers on each hand and on both hands, pictures, pennies, chairs, etc.

B. Count abstractly from 0 to 10: (1) forward; (2) backward.

Counting to 25:

A. Count such objects as the children in the room, windows in the building, automobiles passing the building, trees in the yard, fence posts, marbles, children on the playground.

In a rural school count implements, cattle, horses, sheep, fruit trees, rows of corn, potatoes, etc.

B. Count abstractly to 25: (1) forward; (2) backward.

Counting to 50:

A. Count such objects as passing automobiles, or people passing the school, pennies, sticks, blocks, pages in a small book.

In a rural school count objects on the farm such as cattle, horses, sheep, chickens, implements, tools, fruit trees, rows of corn and potatoes.

B. Count abstractly to 50.

Counting to 100.

Suggested rimes. The following rimes will be found helpful in stimulating the interest in numbers before the formal study of numbers is begun:

One—Two—Three, Part II, page 66
One for the Money, Part III, page 76
This Little Pig Went to Market, Part II, page 65
The Day Is Done, Part II, page 65
One I Love, Part II, page 66
One to Ten, Part II, page 66

Suggested number songs. For the correlation of music with counting, the following number songs are especially well adapted, and can be used with very good results. They will be found in Part III of *Number Helps*.

Mother Goose Schottish, page 82
Ten Little Indians, page 88
Ten Little Fingers, page 89

Suggested sense-training. All the sense-training exercises may be used with great profit in preparation for more formal number study, because success in numbers depends upon certain qualities of mind which sense-training helps to stimulate and develop, namely, attention, observation, concentration, alertness, correct mental pictures, decision, etc. Make frequent use of the sense-training exercises found in Part IV. For counting to 10, use the Sense Test, page 106. Follow directions given to the teacher for these sense-training exercises.

Suggested counting games. Use the following games to teach counting in the concrete. The games may be used also to introduce counting backward.

1. The "Bean Bag Counting Game," Part I, page 4, is especially well adapted for teaching beginning counting. See directions with the game. It is wise to develop rhythm as well as the ability to count. Try to have the counting done in rhythm. After the children can count objects to 10, they may count to 10 abstractly.

2. "The Digits," Part I, page 5, may also be used to advantage in the early work for counting. See the directions for this game. This game should follow the "Bean-Bag Counting Game" because it involves recognition of the digits as well as their order.

3. "Cat and Mouse," Part I, page 7, is well adapted for early use in acquiring number knowledge. See the directions with this game.

4. "The Caller," Part IV, page 105, is a combination of counting and sense-training. Sense-training is so important a process in the development of the number concept that all of the sense-training exercises found in Part IV should be used frequently in the first years of the number work.

II. Counting by 2s to 20; by 5s to 50

Counting by 2s to 10: Have five children stand in a row and have each hold up both hands. The teacher first counts the hands as follows: 2, 4, 6, 8, 10. The children then count with her, after which a volunteer counts alone.

Counting by 2s to 20: Have ten children stand up in a line all holding up their hands, and have the children

learn in the same way to count to 20. Count by 2s forward and backward.

Counting by 2s either to 10 or to 20 may be taught by the use of the number games listed below.

Counting by 5s: Introduce the counting by 5s as follows: Use the nickel as a device for counting by 5s, using the same plan as is used in counting by 2s. Count by 5s forward and backward.

Counting by 10s: Introduce counting by 10s as follows: Either use the 10 fingers of 10 children standing in a row in front of the class, or use 10 dimes as a method of presenting the plan of counting concretely by 10s. Count by 10s forward and backward.

Number games:

1. "Climbing the Stairs," Part I, page 5. Adapt this game by counting 2 for each step. See who can climb the first five steps, 2, 4, 6, 8, 10. See who can climb ten steps, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20. This game may be adapted for counting by 5s and for counting by 10s.

2. "Bean-Bag Counting Game," Part I, page 4. Adapt this game by counting two for each throw to 10 and then to 20; 5 for each throw to 50; 10 for each throw to 100.

3. "The Stagecoach," Part I, page 50. This game may be easily adapted and used for counting by 2s to 20, 5s to 50, and 10s to 100.

Each of the above games may be used for counting backward, first from ten, as 10, 8, 6, 4, 2, and then from twenty, as 20, 18, 16, 14, 12, 10, 8, 6, 4, 2.

III. Reading Numbers Through 100

Reading numbers from 0 to 10: The children may be taught to read numbers by the use of the scores and tally of games. Teach them first to read numbers from 1 to 9, then teach the zero (0).

Games to be used in teaching the reading of small numbers:

1. "The Digits," Part I, page 5. See the directions given with the game.

2. "Card Domino Game," Part I, page 9. Not only does this game teach the reading of numbers, but it also aids in acquiring speed and developing attention. Flash-card drills properly used are especially helpful in promoting speed and accuracy.

3. "Thinking Numbers," Part I, page 22. See directions. This game should be used after the children have had some practice in reading small numbers. After the pupils have learned to read small numbers without difficulty they should proceed with larger and larger numbers until they finally are able to read readily numbers to 100.

IV. Writing Numbers 0 Through 9

Soon after the children have been taught to count, they should be taught to write the digits from 0 to 9.

V. Type Forms

Teach the simple type forms, as: circle, square, oblong, triangle. Incidentally, teach the primary colors: red, yellow, blue.

The type forms should be taught very early in the child's experience. Children love to work with the type

forms and readily learn much about them. The names should be taught incidentally.

The forms should be kept before the children, and whenever reference is made to them the names should be used. In speaking of the square, call it *square*.

Call attention to the sides of the square. Have the pupils discover that the sides are equal; also have them discover that the oblong has the opposite sides equal.

Recognition of the primary colors — blue, yellow, and red — though not a part of number work, may be taught very appropriately with the type forms by use of flash cards with the type forms made in the colors.

Flash-card drills help especially in securing attention, developing the power of observation, and acquiring speed.

Use instructions as found in Part IV, page 103, *Number Helps*, for drill in type forms and color recognition.

VI. Type Solids

Teach the simple type solids, as: cube, sphere, cylinder, and cone.

Each school should have a set of the common type solids. They should be talked about, handled, and used. The names of the solids should be given whenever they are used. Do not say, "This is a cube, etc.," but say, "The cube I hold in my hand, etc." Call the blocks by name and use them often, giving directions as follows: "Mary, take this cube and place it on the right upper

corner of your desk." "Harry, take this sphere and hold it up where all the children can see it." "Tom, place this cone on the left side of your desk."

After the children know the type solids, use them for sense-training. See games to teach type solids, page 99, Part IV, of *Number Helps*.

VII. Beginning Measures

Measure of time: Early in the child's experience he hears the names of the days of the week and the months of the year. The names are introduced here because these names should be taught as soon as possible after the child's experiences bring him into frequent contact with them. Use the following games:

Days of the Week
Months of the Year } See Part I, page 30

The months of the year should be learned in order, beginning with January. The months of the seasons should then be learned also.

Spring	Summer	Autumn	Winter
March	June	September	December
April	July	October	January
May	August	November	February

The following rime should be memorized to fix the number of days in each month:

Thirty days hath September,
April, June, and November,
All the rest have thirty-one,
Excepting February, which alone
Has twenty-eight in fine,
Till leap year gives it twenty-nine.

Measure of value: Children should be taught to recognize the value of small pieces of money: the penny, nickel, and dime.

This may best be done by using money and by playing "Candy Store" or "Toy Store."

VIII. Addition Combinations Through 10

The simple addition combinations should first be introduced in the concrete by the use of such objects as: children, blocks, marbles, pennies, etc.

After the combinations have been thus introduced, there should be much abstract drill with the combinations first to 5, then to 10.

Place all of the combinations through 10 on a chart and use it frequently for drill lessons.

1	1	2	1	3	1	4	0	1
1	2	1	3	1	4	1	3	5
5	1	6	2	1	7	1	8	1
1	6	1	0	7	1	8	1	9
9	0	2	2	3	2	4	2	5
1	5	2	3	2	4	2	5	2
2	6	6	2	7	2	8	0	9
6	2	0	7	2	8	2	4	0
0	3	3	4	2	5	3	6	3
7	3	4	3	5	3	6	3	7
7	4	5	0	4	6	5	8	4
3	4	4	9	6	4	5	0	5

Flash cards should be made using all the foregoing combinations, and much use made of them for rapid drill for speed and accuracy.

After the pupils have had the simple number combinations presented to them in the concrete, use the following games to fix the combinations to 10:

Number Games, Part I:

Birthday Party, page 3
Hunting Wild Geese, page 4
Auto Race (adapt combinations to 10), page 9
Flash Card (adapt combinations to 10), page 10
Combination Drill Game, page 12
Partners, page 14
The Cuckoo Clock, page 16
Fortune Wheel (combinations to 10), page 16
Firemen, page 17
The Twentieth-Century Limited, page 20
Fruit Basket, page 20
Grab Bag, page 23
The Shepherd, page 32
Stepping Stones, page 35
Hall of Fame, page 36
Guessing the Number, page 36
Picking Fruit, page 37
Combination Race, page 38
My Family, page 41
Number Family, page 42
Catch and Say, page 44

Number Rimes, Part II:

Hickory, Dickory, Dock, page 67, adapted
Seven Little Daisies, page 66
One to Ten, page 66
The Old Woman Who Lived in a Shoe, page 68
Baa, Baa, Black Sheep, page 69
Ten Yellow Dandelions, page 70
Ten Little Pennies, page 72

Others may be adapted.

SECOND GRADE

I. Counting — Concrete and Abstract

Review: Counting to 100
Counting backward from 20
Counting by 2s to 20

New: Numbers to 500
Counting backward by 2s from 20
Counting by 5s to 50, forward and backward
Counting by 10s to 100, forward and backward

a. Children should learn the numbers.

b. When counting by 5s to 50, hold up fingers. Each hand counts five. One hand 5, two hands 10, etc.

Use nickels, 5 pennies in 1 nickel
Count — 5 cents, 10 cents, 15 cents, etc.

c. To count by 10s to 100, use fingers on both hands. One child's fingers count 10, two children's 20, three children's 30, etc.

Use dimes in a dollar, 10 cents, 20 cents, etc.

d. Games:

Multiplication Drill, Part I, page 48 (adapt)
Stagecoach, Part I, page 50 (adapt)

e. Rimes:

Baa, Baa, Black Sheep, Part II, page 69 (adapt)
(5 for my master) (10 for my master)
(5 for my dame), etc. (10 for my dame), etc.
Do You Know, My Little Scholar, Part II, page 77
What's a Score, Part II, page 77

II. Combinations—Work for Speed and Accuracy

Review: Addition combinations through 10

New: Finishing the combinations to 20 with reverses. Zero combinations

Develop each new combination concretely, with marbles, lines on blackboard, pennies, etc.

Drill on the combinations until the children know them thoroughly.

Give special attention to the more difficult combinations such as:

7	8	9	8
8	5	7	7

Combinations between 10 and 20 with their reverses:

2	3	4	5	3	4	5	6	6
9	8	7	6	9	8	7	6	5
4	7	9	9	5	7	9	8	8
9	8	8	3	8	6	6	4	3
9	6	7	9	7	6	6	7	7
5	8	9	4	4	7	5	5	7
9	8	9	8	8	8	5	8	6
0	7	7	9	5	8	9	6	9

Zero combinations and reverses:

1	0	3	0	5	0	7	0	8
0	2	0	6	0	5	0	9	0
0	6	0	4	0	9	0	2	0
4	0	1	0	3	0	7	0	8

Number Games, Part I:

Birthday Party, page 3
Combination Drill Game, page 12
Tit-Tat-Toe Puzzle, page 12
Number Race, page 13
Partners, page 14
The Cuckoo Clock, page 16
Fortune Wheel, page 16
Firemen, page 17
Eating Watermelon, page 18
The Twentieth-Century Limited, page 20
Fruit Basket, page 20
Flash-Card Drill Game, page 26
Grab Bag, page 23
Combination and Answer, page 26
The Shepherd, page 32
Stepping Stones, page 35
Hall of Fame, page 36
Guessing the Number, page 36
Picking Fruit, page 37
Combination Race, page 38
My Family, page 41
Number Family, page 42
Catch and Say, page 44

Number Rimes, Part II:

Hickory, Dickory, Dock, page 67
Old Mother Hubbard, page 68
The Old Woman Who Lived in a Shoe, page 68
Baa, Baa, Black Sheep, page 69

Number Songs, Part III:
The Muffin Man, page 90
Two Soldier Boys Go Marching By, page 92

Sense-Training, Part IV:
The Sense of Hearing, page 102
Blind Man, page 105

Tests, Part V:
Exercise I, Exercise II, page 109

III. Roman Numerals

I	II	III	IV	V	VI
VII	VIII	IX	X	XI	XII

By the use of a clock face teach the Roman numerals through 12

I is 1
II is 2 V is 5
III is 3 X is 10

A Roman numeral placed before one of larger value means that the value of the first symbol is to be subtracted from the second, as:

IV is 5−1, or 4 IX is 10−1, or 9

A Roman numeral placed after one of larger value means that the value of the first symbol is to be added to the second, as:

VI is 5+1, or 6 XI is 10+1, or 11

Use: Matching Game, Part I, pages 18–19
Recognition Game, Part I, page 34

A clock face with Roman numerals could be used to advantage when playing this game.

IV. Addition

Sums not greater than 10:

3	4	9	9	2	4	1	2	5	3
4	3	0	1	1	2	7	6	4	5
0	2	1	0	7	0	1	0	1	1

4	3	6	3	2	5	4	2	3	1
1	3	1	1	0	3	2	5	1	6
3	3	3	5	6	1	3	0	2	2

Larger sums:

1	3	6	4	8	4	5	2	5	5
5	4	1	9	7	9	7	9	7	8
6	8	7	3	3	5	5	1	6	4

8	3	5	2	6	3	5	6	5	6
4	7	0	1	2	4	2	3	4	3
0	6	6	4	0	8	7	4	2	7
6	2	3	7	9	2	1	2	3	0

Use such an exercise as the above as an introduction to longer column addition.

Number Games, Part I:

Push Block, page 6
The Bull's-Eye, page 6
Auto Race, page 9 (adapt three or more numbers)
Dodo, page 11 (adapt; use smaller values)
Tit-Tat-Toe Puzzle, page 12
Number Race, page 13
Bags in a Box, page 14
Playing Store, page 22 (adapt one article of each)
Return Ball, page 23

The 100-Yard Dash, page 28
Gun Club, page 61 (adapt)

Suggested rimes, Part II:
One and Two and Nine, page 68
Baa, Baa, Black Sheep, page 69
Ten Yellow Dandelions, page 70
Adapt others.

Tests, Part V:
Exercise 3, page 110

V. Ones and Tens

a. Develop ones and tens by the use of sticks in bundles as follows:

1 bundle of 100 (made up of bundles of 10 each)
10 separate bundles of 10
10 sticks in groups of 1, 2, 3, 4* so that any combinations can be made to 10

3 bundles of 10 = 30 sticks
4 sticks = 4 sticks
34 sticks

34 means 3 tens and 4 ones

9 bundles of 10 = 90 sticks
8 sticks = 8 sticks
98 sticks

98 means 9 tens and 8 ones

*Illustration should be used

b. Dictate numbers from 1 to 100 for practice in writing numbers.

Number Games, Part I:

Thinking Numbers, page 22 (adapt)
Notation Drill, page 30 (adapt)

Number Rimes, Part II:

Barber, Barber, Shave a Pig, page 70
Sing a Song of Sixpence, page 71
Four and Twenty Tailors, page 76

Sense-Training, Part IV:

Telephone, page 101 (adapt)

Two-column addition without carrying:

Harry had 23 marbles and John sold 46 marbles to him. How many marbles did Harry have then?

23
46
69

EXPLANATION: 6 ones and 3 ones are 9 ones. Write the 9 in ones column. 4 tens and 2 tens are 6 tens. Write the 6 in tens column. 23 and 46 are 69.

There are 32 children in one class, 24 in another, and 41 in another. How many children in the three classes? 32 and 24 and 41 are 97. There were 97 children in the three classes.

32
24
41
97

EXPLANATION: 1 one and 4 ones and 2 ones are 7 ones. Write the 7 in ones column. 4 tens and 2 tens and 3 tens are 9 tens. Write the 9 in tens column.

Three-column addition without carrying:

Add 243, 524, and 112.

243
524
112
879

EXPLANATION: 3 ones and 4 ones and 2 ones are 9 ones. Write the 9 in ones column. 1 ten and 2 tens and 4 tens are 7 tens. Write 7 in tens column. 1 hundred and 5 hundred and 2 hundred are 8 hundred. Write 8 in hundreds column. $243+524+112=879$.

VI. Subtraction

Reverse of addition combinations
Without borrowing (2 and 3 places)
Introduced in concrete, follow up in abstract

Two-column addition without borrowing:

Alice had 37 cents. She spent 25 cents for a magazine. How many cents had she left?

37
25
12

EXPLANATION: 5 ones from 7 ones leaves 2 ones. Write the 2 in ones column. 2 tens from 3 tens leaves 1 ten. Write the 1 in the tens column. The difference is 12. 25c from 37c leaves 12c. Alice had 12c left.

Drill the pupil thoroughly in two-column subtraction before beginning three-column subtraction.

Three-column subtraction without borrowing:

A bird store had 358 chicks. They sold 223. How many chicks had they remaining?

358
223
135

EXPLANATION: 3 ones from 8 ones are 5 ones. Write 5 in ones column. 5 tens less 2 tens are 3 tens. Write 3 in tens column. 3 hundred less 2 hundred is 1 hundred. Write 1 in hundreds column. 358 chicks less 223 chicks, leaves 135 chicks. There are 135 chicks remaining.

Number Games, Part I:

Auto Race, page 9 (adapt)
Number Race, page 13 (adapt)
Firemen, page 17 (adapt)
Eating Watermelon, page 18 (adapt)
The Twentieth-Century Limited, page 20 (adapt)
Ball Toss, page 21 (adapt)
Combination Building, page 29
Fox and Geese, page 31 (adapt)
Hall of Fame, page 36 (adapt)
Race-Track Addition, page 39 (adapt)
Speed Relay, page 42 (adapt)
Race-Track Subtraction Drill, page 45
Missing-Number Drill, page 46
Partners—Subtraction Drill, page 47
Silent Subtraction Drill, page 47

Number Rimes, Part II:

Ten Yellow Dandelions, page 70
Ten Little Pennies, page 72

Number Songs, Part III:

Chick-a-dee Song, page 94
Ten Little Indians, page 88
Ten Little Fingers, page 89

Sense-Training, Part IV:

Sense of Hearing—Counting by Sound, page 102 (adapt)

Sense of Touch—Subtraction, page 104

Tests, Part V:

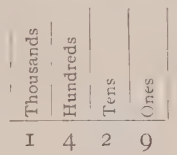
Exercise 4, page 111

THIRD GRADE

I. Reading and Writing Numbers to 1,000

After numbers have been developed to 100 by the use of sticks in bundles of 10 each, 10 bundles of 100 sticks each may be used to make 1,000.

For convenience in reading, numbers are divided into groups of three figures each. Each group is called a *period* and is separated from the other periods by commas. The first period is called ones period, and the places from right to left are: ones, tens, hundreds, thousands.



This number is read *one thousand four hundred twenty-nine*.

Have the children read such numbers as the following:

1	2123	2061	5306	5986
2	1090	2596	4007	7342

Give practice in reading and writing numbers through thousands.

Dictation should be given for writing of numbers in both words and figures.

Games, Part I:
Notation Drill, page 30

Sense-Training, Part IV:
Telephone, page 101

Review thoroughly the 45 combinations (include the zero combinations).

Turn back to the combinations in the outline for the second grade and thoroughly review the 45 combinations, also the reverses and the zero combinations. They will be found on page 136.

Adapt the following games, making them more difficult as necessary:

Number Games, Part I:

Birthday Party, page 3
The Cuckoo Clock, page 16
Combination Drill Game, page 12
Tit-Tat-Toe Puzzle, page 12
Partners, page 14
Firemen, page 17
The Twentieth-Century Limited, page 20
Fruit Basket, page 20
Flash-Card Drill Game, page 26
Combination and Answer, page 26
Grab Bag, page 23
The Shepherd, page 32
Stepping Stones, page 35
Hall of Fame, page 36
Picking Fruit, page 37
Guessing the Number, page 36
Combination Race, page 38
Number Family, page 42
My Family, page 41
Catch and Say, page 44

II. Addition

Review: Without carrying
New: With carrying (three-column and four-column)

Give much practice in single-column addition.

Begin carrying with two-column addition and then proceed to three- and four-column addition.

Tens	Ones	
2	7	2 tens and 7 ones
6	5	5 tens and 5 ones
9	2	

Add ones column, $5+7=12$ (one ten and 2 ones).
Place 2 in ones column and remember the 1 ten.
Place 9 in tens column.

$$27+65=92$$

Give much practice in simple addition for speed and accuracy.

Give speed tests often.

Number Games, Part I:
Hopscotch, page 8
Dodo, page 11

Tests, Part V:
Tests, page 112–118 (C)

III. Subtraction

Review: Three-place subtraction without borrowing
New: Three- and four-place subtraction with borrowing

Subtraction may be taught by the "borrowing" method or by the Austrian method.

Never teach both methods.

Children should be well drilled in the 45 combinations and reverses before subtraction is begun. Much drill should be given in subtraction without borrowing before borrowing is begun.

Borrowing:

Hundreds	Tens	Ones	
3	2	6	Minuend
1	0	7	Subtrahend
2	1	9	Remainder or difference

7 ones is larger than 6 ones.

Take 1 ten from the 2 tens and add it to the 6 ones, making 16 ones.

1 ten = 10 ones
10 ones + 6 ones = 16 ones

It leaves but 1 ten.

7 ones from 16 ones is 9 ones. Place the 9 in ones column.

0 tens from 1 ten is 1 ten. Place the 1 in tens column.

1 hundred from 3 hundreds is 2 hundreds. Place 2 in hundreds column.

The remainder is 219.

Hundreds	Tens	Ones	
6	0	4	Minuend
2	7	5	Subtrahend
3	2	9	Remainder or difference

5 ones is greater than 4 ones.

There are no tens, so first take 1 hundred (10 tens) from 6 hundreds. This leaves 5 hundreds instead of 6 hundreds.

Now take 1 ten (10 ones) from the 10 tens and make the 4 ones 14 ones. (10 ones + 4 ones = 14 ones.) This leaves 9 tens.

5 ones from 14 ones is 9 ones. Place 9 in ones column.

7 tens from 9 tens is 2 tens. Place 2 in tens column.

2 hundreds from 5 hundreds is 3 hundreds. Place 3 in hundreds column.

The remainder is 329.

Tests, Part V:

Exercise 12, page 119

IV. Austrian Method of Subtraction

The Austrian method of subtraction is used by many primary teachers because it does not involve a new process after the pupils have learned to add. The children are taught to add to the number to be subtracted a number large enough to make the sum equal to the number from which they are to subtract.

Frank has 5 cents. Tom has 2 cents. How many more cents has Frank than Tom?

The problem would mean the same if it were stated:

Frank has 5 cents, Tom has 2 cents, how many more cents must Tom get to have as many as Frank? The explanation is given on the following page.

5 cents The number of cents Frank has
2 cents The number of cents Tom has
3 cents The number of cents Tom must get to have as many as Frank.

EXPLANATION: In the above example how many cents must be added to 2 cents to equal 5 cents? $2+?=5$. $2+3=5$. Therefore, write 3 below the line.

Jane has 21 chicks, Pearl has 14 chicks. How many more chicks has Jane than Pearl?

21 chicks, Jane has
14 chicks, Pearl has
7 chicks

EXPLANATION: We must find how many chicks Pearl must get to have as many as Jane. $14+?=21$. $14+7=21$. Therefore Pearl must get 7 chicks to have as many as Jane.

Walter has 42 marbles, Joseph has 26 marbles. How many more marbles has Walter than Joseph?

42
26
16

EXPLANATION: The 2 is less than 6, so we must consider 42 as made up of $30+12$. $6+?=12$. $6+6=12$. Place 6 in the first column. 2 tens added to what $=3$ tens. $2+1=3$. Place 1 in tens column.

$26+16=42$ or $42-26=16$.

Adapt addition games to teach this form of subtraction. Use any of the above simple games.

V. Multiplication Tables

2s, 3s, 4s, 5s, 6s, 7s, 8s, 9s, 10s, 11s, 12s

To introduce the table of 2s:

Count by 2s to 24.

To introduce the table of 3s:

Count by 3s to 36.

To introduce the table of 4s:

Count by 4s to 48, etc.

Multiplication is a short method of addition.

Table of 2s:

Count by 2s to 24.

To show that multiplication is a short method of addition:

One 2 is 2	2	2	2	2	2	2
	2	2	2	2	2	2
Two 2s are	4	2	2	2	2	2
Three 2s are	6	2	2	2	2	2
Four 2s are	8	2	2	2	2	2
Five 2s are	10	2	2	2	2	2
Six 2s are	12	2	2	2	2	2
Seven 2s are	14					

Complete the 2s as above to twelve 2s are 24.

Learn the table of 2s.

$0 \times 2 = 0$

$1 \times 2 = 2$	$4 \times 2 = 8$	$7 \times 2 = 14$	$10 \times 2 = 20$
$2 \times 2 = 4$	$5 \times 2 = 10$	$8 \times 2 = 16$	$11 \times 2 = 22$
$3 \times 2 = 6$	$6 \times 2 = 12$	$9 \times 2 = 18$	$12 \times 2 = 24$

The table of 2s may also be developed in the following way. This is the reverse of the other form:

1	2	3	4	5	6	7	8	9	10	11	12
1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24

$2 \times 0 = 0$

$2 \times 1 = 2$	$2 \times 4 = 8$	$2 \times 7 = 14$	$2 \times 10 = 20$
$2 \times 2 = 4$	$2 \times 5 = 10$	$2 \times 8 = 16$	$2 \times 11 = 22$
$2 \times 3 = 6$	$2 \times 6 = 12$	$2 \times 9 = 18$	$2 \times 12 = 24$

Teach ½ after the table of 2s.
Teach ⅓ after the table of 3s.
Teach ¼ after the table of 4s.
Teach ⅕ after the table of 5s.
Teach ⅙ after the table of 6s.
Etc.

Work for speed and accuracy. Use flash cards and charts. Drill on difficult tables.

Number Games, Part I:

Hunting Wild Geese, page 4
Playing Store, page 22
Return Ball, page 23
Multiplication Drill, page 48
Counting by 2s, 3s, 4s, page 48
Silent Multiplication Drill, page 48
The Store, page 49
Stagecoach, page 50
The Pony Track, page 51
The Multiplication Wheel, page 52
Multiplying Down, page 52

Tenpins, page 53
Factors Game, page 54
Guessing Factors, page 55
Multiples, pages 56 and 57
Foremen and Helpers, page 58
Bouncing Ball, page 58
Catching Mice, page 60

Number Rimes, Part II:
Baa, Baa, Black Sheep, page 69

Tests, Part V:
Exercise 7, page 114

VI. Multiplication

Hundreds	Tens	Ones	
	642		4×2 ones $= 8$ ones. (Place 8 under ones.)
	$\times 4$		4×4 tens $= 16$ tens (1 hundred and 6 tens).
	2568		Place 6 under tens and remember the 1 hundred.
			4×6 hundreds $= 24$ hundreds $\times 1$ hundred $= 25$ hundreds. (Place the 5 under hundreds and 2 under thousands.)

$$4 \times 642 = 2568$$

Tests, Part V:
Exercise 8, page 115
Exercise 9, page 116
Exercise 13, page 120
Exercise 14, page 120

VII. Measures

United States Money

10 cents = 1 dime
10 dimes = 1 dollar
(4 quarters in 1 dollar)
(20 nickels in 1 dollar)

This measure may be easily taught with the table of 10s.

Liquid Measure

2 pints = 1 quart
4 quarts = 1 gallon

This measure may well be taught with the table of 4s.

Linear Measure

12 inches = 1 foot
3 feet = 1 yard

This measure may well be introduced with the table of 3s.

Weight

16 ounces = 1 pound

Dry Measure

2 pints = 1 quart
8 quarts = 1 peck
4 pecks = 1 bushel

This measure may be used with the table of 8s.

Symbols: ¢, $, +, −, ×, =, Roman numerals to XX (call attention to clock face, chapters of books, etc.)

Abbreviations: pt., qt., gal., in., ft., yd., oz., lb.

Terms:

Addition	Subtraction	Multiplication
Sum	Minuend	Multiplicand
	Subtrahend	Multiplier
	Difference or remainder	Product

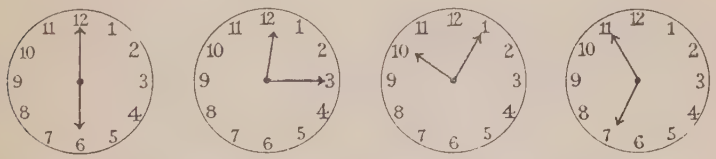
VIII. Telling Time

Teach time by clock face.

The hour hand goes around the clock face once in 12 hours.

The minute hand goes around the clock face once every hour.

Each space between any 2 numbers on the clock face represents 5 minutes for the minute hand and 1 hour for the hour hand.



When the hour hand is at 6 and the minute hand is at 12, it is 6 o'clock.

When the hour hand is just past 12 and the minute hand is at 3, it is 15 minutes past 12.

What time do clocks 3 and 4 indicate?

What time is it when the hour hand is a little past 5 and the minute hand is at 3?

What time is it when the hour hand is a little past 9 and the minute hand is at 2?

What time is it when the hour hand is a little past 9 and the minute hand is at 2?

What time is it when the hour hand is a little past 11 and the minute hand is at 4?

Have the children make up such problems as the above.

IX. Applied Problems

Give many one-step oral problems which are related to the experiences of the pupils. Use much oral drill in rapid addition, subtraction, and multiplication. After the pupils have attained a high degree of accuracy in the simple processes in addition, subtraction, and multiplication, drill for speed. Use all games marked in the contents for the first, second, and third grades, adapting them to the needs of the class. Make them more difficult as the class progresses.

II.K. B.R.

P. 24 - 45 Comb.

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